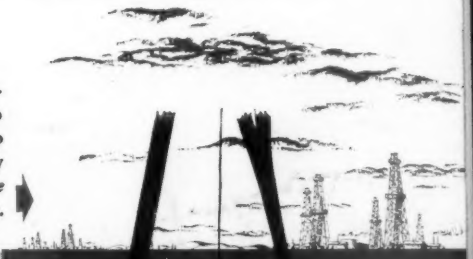
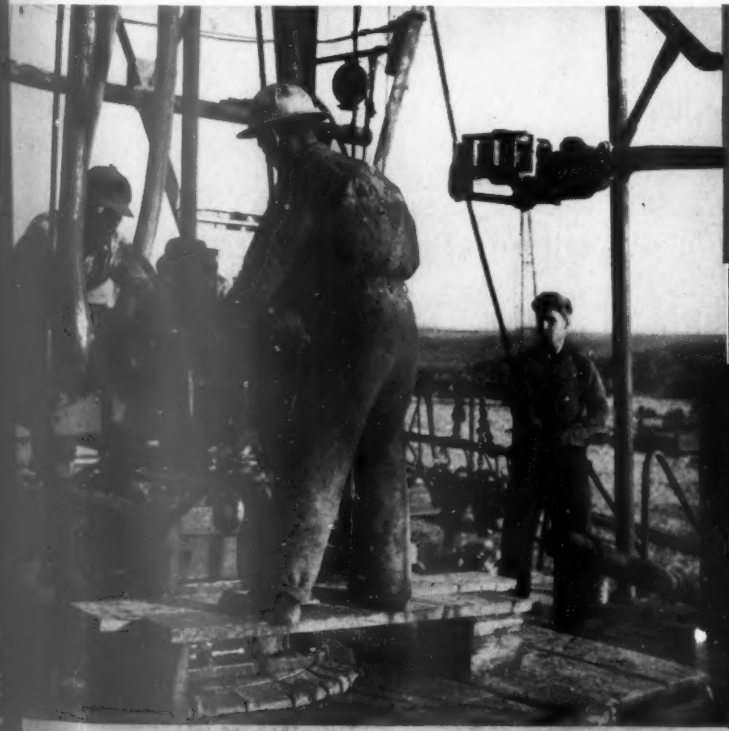
the OIL AND GAS JOURNAL

15,278 Feet Cased with a BJ Slip Grip Elevator and Split Casing Spider

ALMOST THREE MILES of 5½" O.D. casing was floated in and set in Phillips Petroleum Co.'s Ada Price No. 1 with the tools here shown in actual use while the casing was being run. Both equipped with full length slips—any chance of crimping the casing was eliminated and again a new bottom hole record was established.

A CLOSE UP of both the Slip Grip Elevator and the Split Casing Spider used by Phillips, except that Spider is equipped with a hydraulic mechanism for raising or lowering of slips. Operated with water, steam or air—at rig pressures and from any point on derrick floor—dangers encountered when casing is being tailed into the derrick are eliminated. Both Slip Grip Elevator and Spider are hinged for easy removal. *Ask your B.J. man about these tools . . . or consult Composite Catalog.*





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PRICE 20 CENTS

JULY 15, 1944

CAMERON RAM-TYPE TUBING CONTROL HEAD

These rugged ram-type tubing control heads employ numerous mechanical features of the famous Cameron Blowout Preventer; yet, with all their exclusive performance characteristics and proven design these heads actually cost little, if any, more than conventional "set screw" type tubing heads.

The full opening vertical bore freely passes drilling-in tools, liner and screen, and packers. Its rams, provided with patented Cameron Self-feeding Packing Elements, assure positive blowoff protection while tubing is being run, well washed, packer collapsed, tubing suspended, etc. In fact, the highest pressure wells may, with absolute safety, be washed completely clean with water or oil before hanging the tubing.

They provide four proven methods of suspending and sealing the tubing string: (1) Ram suspension on a hanger nipple as illustrated above; (2) Slip suspension in the top flange of the head, utilizing the rams as a master gate below the outlets to seal the annular space between tubing and oil string; (3) Boll-weevil suspension from the top flange of the head; (4) Suspension from a threaded hanger flange which bolts down on top of the head.

They are extremely practical on any reworking subsequent to the original completion of the well. When used in conjunction with a second Cameron ram-type control unit, tubing may be raised or lowered, or pulled from the well under pressure without killing and without disassembling the tree.

They obviate the need for a cement retainer when making a squeeze job.

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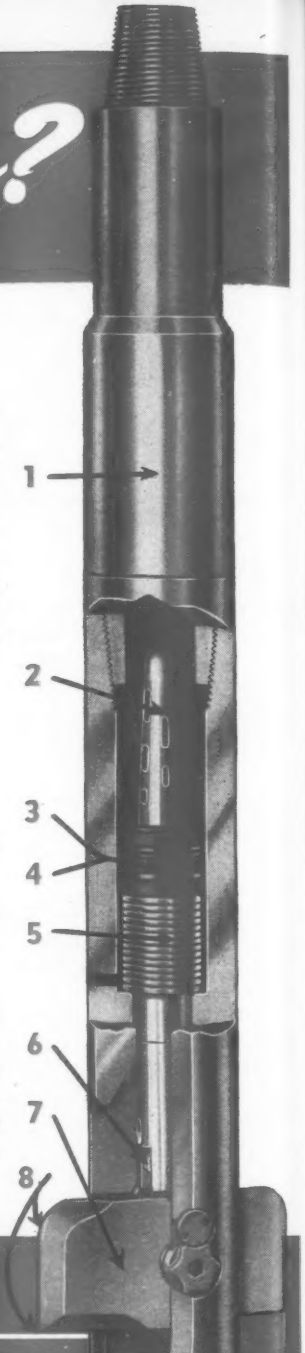
Are You a Quiz Whiz?

Every man in the drilling and producing branches of the oil industry should know the answers to the following questions as to the design, construction and operation of the Baker Rotary Wall Scraper. They are factors which directly affect the proper drilling and completion of any oil well to make it a profitable, long term investment.

If you know the answers to 6 questions you rate a QUIZ WHIZ rating of fair; 7 answers, medium; 8 answers, good; 9 answers, expert; 10 answers, super; 11 correct answers, super-duper. No time limit! Don't peek at answers below until you have studied *all* the questions and are ready to know your QUIZ WHIZ rating.

1. Name this simple part.
2. What is the purpose of this cone-shaped screen?
3. This Plunger Head is provided with oil-resistant seals. Why?
4. Why are two of the seals facing up, and one down?
5. Why is a Plunger Spring used?
6. What is the purpose of this Circulation Bean (or bushing)?
7. Why are the blades made of hard, tough alloy steel forgings, with cutting edges set with tungsten carbide inserts?
8. Why is the vertical scraping surface of the blades so great?
9. The reaming capacity of Baker Wall Scrapers is really amazing. What is the minimum and maximum reaming gauge of the full complement of sizes?
10. Give three important uses for the Baker Rotary Wall Scraper.
11. What company originated this tool and provided the name?

Confidentially, how did you make out? There are many other important features about the Baker Rotary Hydraulic Expansion Wall Scraper which you should know if you have anything to do with the drilling and completion of oil wells. May we suggest that you turn to Page 361 of the 1944 Composite Catalog to see how this successful tool will fit into your operations. If you prefer the separate Baker 1944 Catalog, the nearest office will be glad to supply you with one.



BAKER OIL TOOLS, INC.

Houston · LOS ANGELES · New York

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States—Page 124

CRUDE-OIL STOCKS 228,860,000 bbl. as of July 1—down 472,000 bbl. One year ago 240,927,000 bbl.

GASOLINE STOCKS 83,559,000 bbl. as of July 1—down 2,441,000 bbl. One year ago 77,185,000 bbl.

RESIDUAL FUEL-OIL STOCKS 52,235,000 bbl. as of July 1—down 522,000 bbl. One year ago 65,566,000.

GAS OIL AND DISTILLATE STOCKS—35,360,000 bbl. as of July 1—up 1,032,000 bbl. One year ago 32,546,-000 bbl.

CRUDE-OIL PRODUCTION 4,563,550 bbl. daily average week ended July 8—down 18,950 bbl. Year ago 4,099,695.

REFINERY RUNS 4,638,000 bbl. daily week ended July 1—no change. Year ago 3,892,000 bbl.

THE accelerated decline in crude-oil stocks in recent weeks is causing concern among many who are attempting to balance their supplies and demands through the remainder of the summer months. Despite the record production during June, the reduction in stocks of refinable crude oil for the 5-week period ending July 1 totaled 5,563,000 bbl., an average daily decline of 158,000 bbl. There were refining and crude-oil marketing companies which were compelled to draw on their minimum working stocks in order to take care of their commitments. Taking into consideration the output of natural gasoline and associated products, as well as crude oil, the large decline in inventories means that the actual demand for liquid petroleum last month was in excess of 5,000,000 bbl. daily. Demand will rise further in July, with continued mounting requirements in prospect for the remainder of the year.

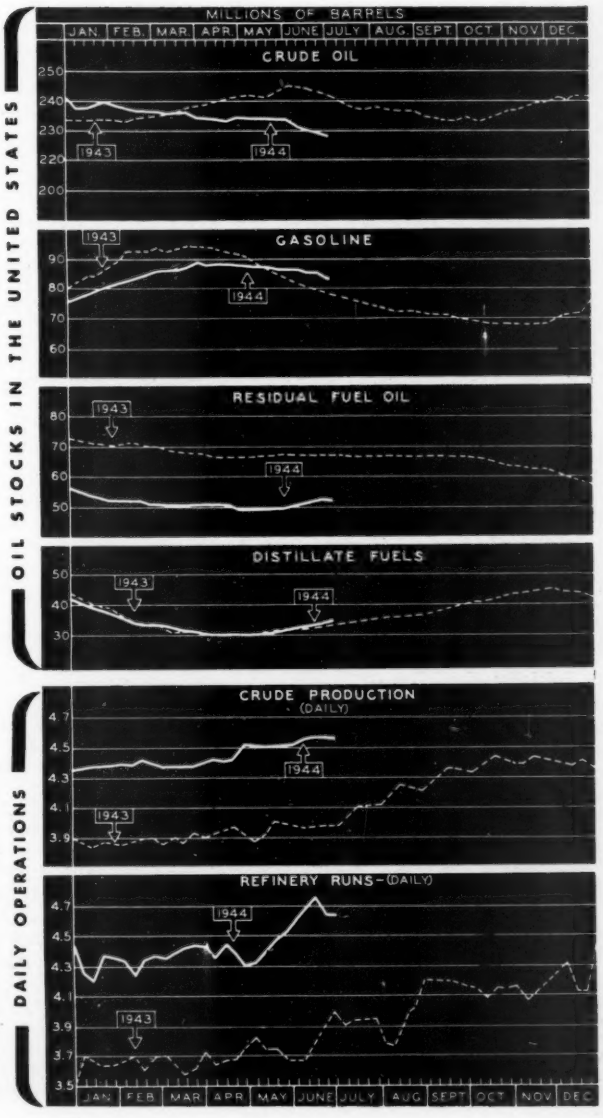
The following table gives a breakdown of stocks on July 1 compared with a year and 3 years ago:

STOCKS, JULY 1 (1,000 BBL.)

	1944	1943	1941
Refinable crude oil	228,860	240,601	259,075
East of California	206,911	207,175	224,166
California	21,949	33,426	34,909
Principal products	180,836	174,123	206,009
East of California	126,472	103,530	122,933
California	54,364	70,593	83,076

THE data given in the table are based on more than one source of information and are not entirely comparable. However, the table does reflect changes in the nation's petroleum inventories except for those in control of the military.

OVER the past year and since July 1, 1941, the largest decline in stocks has been in California. In this connection analysts are pointing out that the stock situation in California is no more threatening than it is elsewhere. Operators in that state were accustomed to maintain greater inventories in relation to demands than in the remainder of the United States, and the opportunity to reduce these stocks in the early part of the war period was welcomed by many. This was particularly true in regard to residual fuel oil. Investigators are in agreement that there are no excess above-ground stocks anywhere, a conclusion that takes into consideration seasonal requirements and the projected war shipments for the rest of the year.



Subsidy Payments for Crude Authorized

by Henry D. Ralph

Accompanying this summary of the crude-oil subsidy and its implementing directive is the complete list of pools qualified by the Office of Price Administration to receive payments and the cents per barrel for each certified for reimbursement to the first purchasers in the field.

WASHINGTON.—The administration's stripper-well subsidy plan, which has been pending for many months as an alternative to a general increase in the price of crude petroleum, has finally been promulgated and will go into effect August 1.

As of that date the crude-oil price schedule of the Office of Price Administration will be amended to increase the price ceilings for some 880 fields throughout the United States by amounts ranging from 20 to 75 cents per barrel. At the same time Defense Supplies Corp. will stand ready to pay to the first purchasers of this crude subsidies equal to the increase in price. Subsidy payments will not be made to individual wells, leases, or producers, and because of the subsidy the increased crude prices will not affect the prices of petroleum products produced from this crude.

The price increases and corresponding subsidies will be 35 cents per barrel for fields averaging less than 5 bbl. daily per well; 25 cents per barrel for fields averaging between 5 and 7 bbl. daily per well; 20 cents per barrel for fields averaging between 7 and 9 bbl. daily per well; and 75 cents per barrel for all wells producing Pennsylvania Grade crude.

Field Average Governs

All determinations will be on a field basis. This will mean that no premium price will be available to a well making less than 9 bbl. if the average of the field is more than 9, and also that the premium will apply to oil from a well making more than 9 bbl. in a field with an average production per well of less than that.

Initially the plan will apply to some 280,000 wells, which is about 75 per cent of the number of producing wells in the country but which account for only about 12 to 15 per cent of total oil production. The premium price may be extended to other fields later, and it is also possible that some field may be taken off the list, though this is not probable. In cases where the higher price enables operators to clean out their wells or otherwise lift production so that the average per well exceeds the maximum for that premium price bracket the subsidy will be continued in that field, the theory being that this is one of the purposes of the subsidy and that operators should not be penalized by a price cut for actions taken to increase production.

The fields on the premium price list were selected by OPA on the basis of the records of the various state conservation commissions for the month of December 1943. Some errors may be found and corrected later, but OPA intended to cover all fields where production per well averages 8.9 bbl. per well or less. OPA had hoped to base the determination on the average for the entire year 1943, but the state commissions were unable to supply these figures on short notice.

In defining a field, OPA is using the practice of the oil industry in buying oil on the basis of posted field prices, on the theory that industry usage has pretty well defined the limits of individual fields. Where there are disagreements over the limits of a field, OPA plans to set up field committees of the industry to make determinations. The National Stripper Well Association has offered to assist in this work.

Stripper-well fields not on the original OPA list may be brought under the premium price plan by application to OPA on an adequate showing. In such cases it must be shown that production per well has been below the maximum of the applicable price bracket for a period of 12 months prior to the application. This is to prevent an artificial slowdown of production for a short period in order to qualify for the subsidy. Similarly, a field in the 20-cent bracket may be transferred to the 25 or 35-cent bracket on a showing of reduced production per well over a 12-month period. OPA may make a number of adjustments, both up and down, in the premium prices for various fields on the basis of further facts as to production per well.

Under various conditions OPA may make the premium price applicable to fields producing an average of more than 9 bbl. per day. Instances would be fields where expensive secondary-recovery systems have been installed, where wells are of unusual depth in relation to volume of production, fields with a high water-oil ratio, fields with special mud problems, or fields where other special conditions create unusually high operating expenses.

In all such cases the determinations will be made on a field-wide basis, and individual high-cost wells within a field will not be given consideration. OPA's authority in this regard extends to all fields where the existing price is below the average cost of production because of certain high-cost factors, but OPA officials stated that their thinking has not yet jelled as to how to determine average cost of production nor as to when this authority will be applied. After conferences with the industry, OPA expects to determine an uneconomic limit on the cost of crude production and it will refuse to approve a premium price for fields which yield a very small amount of oil at a very high cost per barrel.

OPA Determines Eligibility

Under the procedure worked out by the agencies concerned, OPA determines what fields are eligible for a premium price after consultation with the Petroleum Administration for War. Since PAW did not have time to check the original list of some 880 fields prepared by OPA it gave its approval virtually as a matter of form, but probably will be consulted by OPA in detail when applications are filed regarding additional fields or when changes in the list are under consideration.

Certification by OPA consists of issuing an amendment to its crude-price schedule, No. 436, increasing the ceiling price for designated fields. This constitutes notice to Defense Supplies Corp. to pay the subsidies called for beginning on the designated date. DSC has authority to make determinations before paying the subsidies, but this is simply a precaution against fraud and will not involve any delay or further investigation by DSC before putting the plan into effect. DSC has the right to audit accounts and make other investigations before paying the subsidy if fraud is suspected, or could stop payments in cases where some flush production is brought in

in a field which formerly was classed as a stripper-well field.

DSC has not yet issued its regulations under which payments will be made, but officials declare these will be ready in ample time. Report forms, drawn up in consultation with OPA, will soon be available for all first purchasers of premium-price crude, and these will be returned to DSC after producers have been paid for the oil. Since oil purchased after August 1 normally is not paid for until early in September, DSC will not start making payments until the middle of September. Officials promise that checks will be mailed no later than 2 weeks after the report forms are received. Approximately 95 per cent of the wells covered by the subsidy plan are in states which have severance taxes, and DSC expects to use state tax records as a convenient check against claims for subsidy payments.

Normally the subsidy will go to the first purchaser of crude from designated fields, which will usually be a refiner or a pipe-line company. In some cases, however, a refinery may have its own production in a stripper-well field, and the regulations provide that the subsidy may be paid to the producer.

Secondary-Recovery Provisions

Premium prices for crude from secondary-recovery projects probably will be given under OPA's authority to allow a 35-cent premium for high-cost fields producing more than 9 bbl. per well. This matter will be given further study, and if found necessary additional provisions may be made for secondary-recovery projects.

The subsidy plan was outlined in a directive to the OPA and the secretary of commerce (who has jurisdiction over DSC) issued by Fred M. Vinson, director of economic stabilization, under date of June 28. It was originally planned to put the program into effect July 1, but the delay was caused by DSC which desired to give it a thorough study. Secretary of Commerce Jesse Jones approved the plan on July 5 and the directive was made public the following day. Until July 6 OPA did not have authority to consult with PAW regarding the fields to be covered initially, nor could it take any other official steps toward putting the program into effect.

Officials estimate that the subsidy will amount to about $50,000,000 per year, and both OPA and the Office of Economic Stabilization have consistently maintained that this would be far cheaper to the country and to the Government as a purchaser of oil than a general crude-price increase, and also that it will be less inflationary and will be equally effective in maintaining production from stripper and high-cost wells.

The OPA regulation cuts back the ceiling on the Smackover field below what it has been recently but also makes Smackover eligible for a premium price, the effect being that after August 1 the Government rather than refiners will absorb the higher price for Smackover crude. This was not done with regard to any other field which has had a price increase, since Smackover was the only one where refiners complained of hardship in absorbing the increase.

Chester Bowles, director of OPA, and Fred M. Vinson, director of OES, collaborated last week and this in implementing the stripper-well subsidy plan

Vinson's Directive Leaves Problem of High-Cost Production Open for Study

Text of the directive follows:

OFFICE OF ECONOMIC STABILIZATION, DIRECTIVE.

Whereas the Petroleum Administration for War has previously found that prolongation of somewhat higher cost production of crude oil is in the interest of maximum production of crude oil for war purposes; and,

Whereas, as Director of Economic Stabilization, I determined on October 29, 1943, that there could be no general increase in the price of crude oil consistent with the stabilization program and at the same time determined that "Use of known and available productive capacity is imperative"; and,

Whereas, as Director of Economic Stabilization, I find it necessary to insure the maximum necessary production and distribution of crude oil, to maintain ceiling prices, to prevent a price rise inconsistent with the purposes of Executive Orders Nos. 9250 and 9328, and to aid in the effective prosecution of the war; now therefore,

By virtue of the authority vested in the president by the constitution and laws of the United States, and particularly by the Act of October 2, 1942, entitled "An Act to amend the Emergency Price Control Act of 1942 to aid in Preventing Inflation and for Other Purposes" (P.L. 729, 77th Cong.) and vested in turn by the President in the Stabilization Director by Executive Orders Nos. 9250 and 9328, the following Directive is issued:

1. The Price Administrator, in consultation with the Petroleum Administrator for War, shall determine which fields during a representative period of the year ending December 31, 1943, had an average per well production of less than 9 bbl. per day; and thereafter, from time to time, he shall determine which additional fields have produced an average of less than 9 bbl. per well per day for a period of one year preceding the date of application for such determination.

2. The Price Administrator is directed at the earliest date administratively feasible to increase existing maximum prices of crude oil produced from these fields (expect in the Pennsylvania grade fields as hereinafter described) in the following amounts:

Daily average for well prod. of field in terms of 42-gal. bbl	Amt. price increase cts. for 42-gal. bbl.
Less than 5	35
5 and above but less than 7	25
7 and above but less than 9	20

In the Pennsylvania-grade fields in Pennsylvania, West Virginia, New York and Ohio, where wells average about ½ bbl. per day and produce crude oil high in lubricating qualities, the increase in the existing maximum price is to be 75 cents per barrel.

Eligibility of the field for the increased price is to be based initially upon the average production per well per day for a representative period of the year ending December 31, 1943; thereafter, eligibility shall be based upon the average production per well per day for a period of 1 year preceding the date of application therefor.

3. The Price Administrator is further

authorized to increase existing maximum prices of crude oil by not more than 35 cents per barrel on oil produced in fields where the daily average per well production is 9 bbl. or more, if it is found that (a) because of certain high-cost factors, the maximum price for crude oil produced at a particular field is below the average cost of production and (b) the cost of production is not out of proportion to the output obtainable.

4. At the time he places such increased price in effect in each field, the Price Administrator is directed to certify to the Secretary of Commerce the field at which such increase is made pursuant to this Directive, the effective date of such increase and the amount thereof.

5. The Secretary of Commerce is hereby directed to take such action and make such determinations as are necessary under existing law to cause one of the corporations organized pursuant to Section 5(d) of the Reconstruction Finance Corp. Act, as amended, to exercise its authority under Section 2(e) of the Emergency Price Control Act of 1942 to pay subsidies for the following purposes:

(a) To reimburse purchasers for amounts expended for crude oil, the maximum price for which is increased pursuant to this directive, in excess of amounts that such purchasers would have been permitted to pay on the basis of maximum prices as they existed prior to the increases herein authorized; and

(b) To make premium payments to any producer of crude oil, the maximum price for which is increased pursuant to this directive, of an amount equal to the price increase authorized by this directive multiplied by the number of barrels of such crude oil produced, and not sold but refined, consumed or otherwise utilized by such producer.

6. The Secretary of Commerce after consultation with the Price Administrator shall cause the corporation designated to pay the subsidies contemplated herein to prepare a compensatory regulation establishing proper safeguards and procedures for the administration of the program envisaged by this directive.

Issued this 28th day of June 1944.

/s/ Fred M. Vinson, Director, Office of Economic Stabilization.

Complete List of Field Increases Certified So Far by Price Agency

REVISED Maximum Price Regulation 436 is amended in the following respects:

1. The note at the beginning of Article 2 entitled "How to determine maximum prices for crude petroleum" is amended by adding the following sentence at the end of such note: After ascertaining a maximum price under Section 10 or 11, examine Section 12 to determine whether or not any increase or increases have been made thereto.

2. Section 10 (a)(2) is amended to read as follows: (2) Smackover field. The maximum price at the receiving tank for crude petroleum produced in the Smackover field, Ouachita and Union counties, Arkansas, shall be a flat price of 83 cents per barrel.

3. Sections 12, 13 and 14 are renumbered 13, 14 and 15, respectively, and Section 12 is added to Article 2 to read as follows:

Section 12. Increases to maximum prices. (a) The maximum price at the receiving tank for producers and owners of royalty interest for crude petroleum produced in any of the pools set out below shall be the maximum price as determined under Section 10 or 11 and the amount of the increase designated below:

ARKANSAS

Pool and county—	Increase (cents per barrel)
El Dorado, East, Union	25
El Dorado, South, Union	35
Lewisville, Lafayette	20
Lisbon, Union	35
Nick Springs-Cotton Valley, Union	35
Smackover, Ouachita, Union	20
Stephens, Columbia, Nevada, Ouachita	35

COLORADO

Berthoud, Larimer	20
Boulder, Boulder	35
Florence, Fremont	35
Orchard-Greasewood, Weld	25

ILLINOIS

Aden, Wayne and Hamilton	25
Albion, North, Edwards	35
Barnhill, Wayne	35
Bartelso, Clinton	25
Bartelso, South, Clinton	25
Beaver Creek, Bond	20
Beman, Lawrence	35
Browns, South, Edwards	35
Brunt Prairie, White	20
Carlyle, Clinton	35
Centralia, Clinton and Marion	25
Cisne, Wayne	25
Colmar-Plymouth, McDonough-Hancock	35
Cordes, Washington	25
Cowling, Edwards	35
Cravat, Jefferson	25
Dahlgren, Hamilton	35
Du Bois, Washington	35
Du Bois, West, Washington	25
Dundas Consolidated, Richland and Jasper	35
Dupo, St. Clair	35
Eldorado, Saline	35
Elkville, Jackson	25
Gillespie Wyen, Macoupin	35
Hoffman, Clinton	35
Ingraham, Clay	35
Inman, Gallatin	25
Johnsonville, South, Wayne	35
Junction, Gallatin	35
Keensburg Consolidated, Wabash	20
Lakewood, Shelby	20
Lancaster, Wabash and Lawrence	25
Leech, Wayne	20
Litchfield, Montgomery	35
Mason, Effingham	35
Maunie, North, White	35
Mount Carmel, West, Wabash	25
Mount Erie, North, Wayne	25
Patoka, Marion	20
St. Francisville, East, Lawrence	20
Ste. Marie, Jasper	20
Sesser, Franklin	25
Southeastern field, Lawrence, Clark, Crawford and Wabash	35
Stewardson, Shelby	20
Storms, White	20
Thompsonville, Franklin	35
Toliver, Clay	35
Wamac, Marion, Clinton and Washington	35
Waterloo, Monroe	35
Whittington, West, Franklin	25
Woburn, Bond	35
Xenia, Clay	25

INDIANA

Bristow, old, Perry	35
Bufkin, Posey	20
Cannelburg, old, Daviess	35
Carbon, West, Posey	35
Columbia, Gibson	35
Enterprise, Spencer	35
Evansville area, old, Posey and Vanderburgh	35
Francisco, East and West, Gibson	35
Grandview, Spencer	35
Hatfield, Spencer	20
Hazleton, old, Gibson	35
Hensler, Posey	20
Hovery Lake, Posey	20
Johnson, Gibson	35
Kirksville, Gibson	20
Mount Carmel, Gibson	20
Petersburg, old, Pike	35
Rockport, Spencer	25
St. Francisville, Knox	35
St. Francisville, East, Knox	20
St. Thomas, Knox	35
Shelburn, old, Sullivan	35
Siosi, Sullivan and Vigo	20
Somerville, Gibson and Pike	35
Troy, old, Spencer	35
Veale, old, Daviess	35
Washington, old, Davies	35

KANSAS

Abbyville, Reno	25
All pools, Allen	35
All pools, Anderson	35
All pools, Chautauqua	35
All pools, Franklin	35
All pools, Linn	35
All pools, Miami	35
All pools, Neosho	35
All pools, Wilson	35
All pools, Woodson	35
Augusta, Butler	35
Augusta, North, Butler	35
Baird, Cowley	20
Baird, East, Cowley	20
Bausinger, Butler	35
Benton, Butler	25
Bidde, Cowley	35
Blackwell, Greenwood	35
Blankenship, Butler	35
Bridfeldt, West, Rice	20
Bringar, Greenwood	35
Browning, Greenwood	35
Burden, Cowling	35
Bush-Denton, Elk (West Half)	35
Callyer, Elk	25
Chandled, Sumner	25
Chindburg, McPherson	25
Christy, Greenwood	35
Churchill, Sumner	25
Clark, Cowley	20
Clever, Cowley	25
Countryman, Cowley	35
Covert-Sellers, Marion	25
Craber, McPherson	20
David, Cowley	20
David, South, Cowley	35
Demaloris-Snowden, Greenwood	25
Dory, Elk	35
Douglas, Butler	35
Dunaway, Greenwood	35
Dunkelberger, Elk	35
Eastborough, Sedgwick	20
Eastman, Cowley	35
Eckels, Butler	20
Eichman, Russell	35
El Dorado, Butler	35
Eureka, Greenwood	35
Fairfield, Russell	25
Fall City, Cowley	35
Ferguson, East, Elk	20
Ferguson, West, Cowley	35

(Continued on page 61)

All pools in certain states and some pools in other states are omitted from OPA's list of authorized payments owing to lack of adequate information by which to determine eligibility. No payments are authorized as premiums at this time in Alabama, California, Florida, Mississippi, Utah and Virginia.

THIS WEEK

PRICES—At long last the stripper-well subsidy plan becomes a reality, starting August 1. . . . Only 12 to 15 per cent of national production will qualify, under present rules. . . . First purchasers of crude to receive reimbursement for increases from Defense Supplies Corp. . . . ¶Prompt payment promised to avoid tying up limited capital of small purchasers. . . . Most subsidy fields, probably 80 to 85 per cent, qualify for 35-cent premium. . . . Question of reimbursing operators of high-cost properties, even though output exceeds subsidy maximum of 9 bbl. daily, left open for later decision. . . . ¶Bulk of producers, purchasers and most refiners dissatisfied with makeshift approach to price problem. . . . Stripper operators feel subsidy is "better than nothing at all," assert offset against higher costs will improve long-term production outlook. . . .

EXPLORATION—Discoveries in East Texas and California, 3-mile extension to West Edmond field, improved outlook in West Moore field, both in Oklahoma, stimulate wildcat interest. . . . ¶Companies continue broad leasing campaign on Atlantic Coast. . . . One company reported buying in Connecticut River Valley. . . . Largest wildcat acreage concentrations center on coasts of North and South Carolina, Virginia, Maryland and Delaware. . . . ¶East Texas discovery opens much prospective territory, gives area much needed stimulant after long series of disappointments. . . .

DRILLING—Insufficiency of rigs reported in practically all areas, particularly acute in newer fields, including Heidelberg, West Edmond, several in West Texas. . . . ¶Completions fall slightly behind last week's record rate for the year. . . . ¶Drilling activity for last 6 months will average 475 wells per week, if present pace is maintained. . . . ¶Uncertainties of manpower and equipment are the chief deterrents to a 500-well per week average.

SUPPLIES—Military requirements for gasoline over the next 90 days expected to total 40 per cent of all consumption. . . . ¶National stocks of civilian gasoline continue downward trend, totaling 46,513,000 bbl. on June 24. . . . ¶Crude-oil inventories sink to 20-year low, continue downward. . . . ¶PAW reported considering another cut in maximum octane for regular gasoline, possibly limiting ceiling to 70. . . . ¶East Coast stocks of civilian gasoline and kerosene 371,000 bbl. in week but inventories of other oils in that area decline 327,000, leaving insignificant net gain of 44,000 bbl. . . .

REFINING—Limit of ability to absorb higher crude costs in OPA selected fields hastened inauguration of subsidy. . . . ¶Most war plants exceeding designed rates of operation. . . . Pressure applied constantly for higher production of military fuels, lubricants, greases. . . . Combination of high operating rates, inexperienced manpower, substitute equipment blamed for recent crop of refinery accidents. . . . ¶Strain on interdistrict movement of crude may be alleviated by subsidy, if it proves real incentive, in areas receiving bulk of payments. . . .

MATERIALS—Conversion of manufacturing facilities to petroleum industry equipment items is gaining momentum, not a race but coming about gradually. . . . ¶Volume is difficult to appraise. . . . Converted plants are widely scattered, many produce inconspicuous parts which, none the less, contribute surprisingly importantly to vital assemblies. . . .

Prosaic producing fields, such as this one in the Rocky Mountain district, were in the week's spotlight as operators, purchasers and refiners analyzed their individual positions with respect to the subsidy payments which start August 1

Ohio Oil Co. Expands East Coast Acreage

NEW YORK. — The Ohio Oil Co., one of the most aggressive companies in the East Coast lease play, last week was reported to have acquired exploratory rights on 150,000 acres of wildcat acreage from the United States Sugar Corp., south of Lake Okeeschobee, Florida.

Unconfirmed reports are that Ohio Oil Co. is leasing in the Connecticut River Valley where a narrow sedimentary basin is known to exist. The river divides New Hampshire and Vermont, flows across Massachusetts and Connecticut, emptying into the sea on the south shore of that state.

The Ohio company is interested along with Pure Oil Co., Sun Oil Co., Standard Oil Co. (New Jersey), Sinclair Prairie Oil Co. and others in the leasing play which extends virtually the entire length of the East Coast from Florida to Maine. Much of the recent leasing activity has centered on the coastal areas of North and South Carolina, Virginia, Maryland and Delaware.

PAW Promotes Two Men In Foreign Division

WASHINGTON.—William C. Frysinger and John D. Kurtz last week were appointed directors of the Foreign Supply and Distribution Division of the Petroleum Administration for War. Both were promoted to the new positions from within the PAW foreign division.

W. G. FRYSINGER

J. D. KURTZ

Frysinger's primary responsibilities will relate to short-term supply and transportation problems. The duties of Kurtz relate to long-term scheduling and planning and administration.

Before his appointment to the PAW staff in February 1943, Frysinger was with Atlantic Refining Co., stationed in Philadelphia. He has had 23 years' experience in the foreign sales department of that company in this country and abroad. From December 1928 to November 1939 he was managing director of the company's branch in Hamburg, Germany.

Kurtz was appointed to the PAW staff in August 1941. He also was formerly with the foreign sales department of Atlantic Refining Co., stationed in Philadelphia. He was associated with the company from 1928 until drafted by PAW.

From July 1932 to December 1937 he was assistant manager of Atlantic Oil Storage Co., an Atlantic Refining Co. subsidiary, in Antwerp, Belgium, and assistant manager of the Atlantic Refining Co. of Germany in Hamburg. He returned to the United States in 1938 as territorial comptroller and assistant on cargo purchases and sales.

J. R. McWilliams Appointed PAW Director of Production

WASHINGTON.—Appointment of J. R. McWilliams, vice president of Carter Oil Co. and manager of the Northwest division, as director of production, Petroleum Administration for War, effective August 1, has been announced by Ralph K. Davies, deputy administrator of PAW. He succeeds D. R. Knowlton, of Phillips Petroleum Co., who resigned a few weeks ago to assume direction of foreign operation for that company.

J. R. McWILLIAMS

McWilliams' experience in the oil industry covers a period of 20 years. Following a year's field work, he joined Skelly Oil Co. in 1925 as production engineer. In 1933 he became assistant Oklahoma proration umpire, and the following year joined Carter Oil Co. In 1936 he was named vice president of Standard Oil Co. of Louisiana, in charge of the producing division. In 1939 he was appointed president of Louark Producing Co., and 2 years later rejoined Carter as director and manager of the production department. In 1944 he was elected vice president of the company and sent to Billings, Mont., to the post he held when he was given the PAW assignment.

PAW Authority Broadened Over Industry Materials

WASHINGTON. — A new agreement between the War Production Board and the Petroleum Administration for War delegates PAW authority to approve petroleum industry applications for new construction projects costing up to $100,000 each.

Previously all projects above $25,000 were reviewed by WPB Facilities Bureau. The new limit will cover about 95 per cent of oil industry construction applications, meaning that PAW's authority over materials now is virtually independent of other agencies.

Sinclair's Wildcat Program Extensive

NEW YORK. — Thirty-six wildcat tests are either now drilling or are scheduled to be drilled in the remaining months of this year in the most extensive exploration program ever undertaken by Sinclair Oil Corp. subsudiaries, it was disclosed here last week.

Only 33 per cent of the 1944 exploration program was completed during the first 6 months, when five wells were completed as oil or gas wells and 13 part or full-interest failures were abandoned for a total of 18.

Of the 36 locations drilling or remaining to be drilled are four deep tests in Mississippi. Two 10,000-ft. wildcat wells are located in Colorado County, Texas, one a producer. The deepest wildcat is in Winkler County, Texas, which has been drilled to 12,300 ft. and is now testing oil shows. Other areas in which important tests will be made are in Trego, Decatur and Rawlins counties, Kansas; Michigan, Louisiana and Wyoming. Additional drilling on acreage classed as semiwildcat is under way in New Mexico, Wyoming and Oklahoma.

George E. Dewey Is Named Manpower Counselor

George E. Dewey was named manpower counselor to Petroleum Administration for War last week to succeed F. H. Harbison, who is returning to the faculty of University of Chicago. Dewey has been assistant counselor since this division was created to meet the manpower requirements of the petroleum industry.

G. E. DEWEY

A native of Grant Park, Ill., he attended both Purdue University and Colorado School of Mines, receiving his degree in petroleum engineering from the latter institution in 1929.

In 1930, Dewey joined Standard Oil Co. of Indiana, engaging in engineering research at the Whiting laboratories. In 1937 he was transferred to Standard's Chicago offices. He joined Petroleum Administration for War in September 1942. In March 1943 he was appointed assistant manpower counselor.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Main Problems Continue

THE petroleum industry and its customers should understand fully the meaning of the government subsidy for stripper wells which becomes effective August 1. In palming off this ruse as a solution for the immediate and long-range problems of operators who have the responsibility of finding and producing crude oil to meet constantly mounting needs, Washington officials lay themselves open to the charge of playing politics.

So far as the owners of the stripper wells are concerned, they are entitled to higher returns. They should have had them long ago, not through a special dispensation of governmental agencies, but through the workings of supply and demand applying to the entire oil industry of which they are an important part.

This method of attempting to aid an essential enterprise has no parallel in the war program. If such an approach to a production problem, in which a part is separated from the whole for a price consideration, is sound then it should have been used in other industries and certainly in agriculture. The same variations in costs will be found in these other activities as in petroleum.

Washington officials obviously are using the stripper-well subsidy as a stall while they wait for a more opportune time to bring forth whatever plan they hope to fasten on the petroleum industry as a permanent program in domestic and international operations. They assume that by refusing to give the entire industry the assistance to which it is entitled in the light of war and peace tasks they can so weaken its operations that permanent and complete federal controls later can be made to appear the logical way out.

The quantity of additional crude oil that will be made available from the stripper wells, which collectively accounted for less than 15 per cent of last week's 4,543,550 bbl. daily production, will be negligible. The subsidy, with its inevitable inequities, gives the greatest premiums to the smallest production, a provision which does not point to enlarged output. Furthermore, it should be kept in mind that an agency which has authority to advance prices in special cases could, in its omnipotence, reduce them in other situations if it considered that action politically expedient.

The industry, generally, after August 1 will be exactly where it has been since Pearl Harbor. Those operations which account for 85 or more per cent of current production and which expanded their output over the past year far more than the combined output of all stripper wells, will continue to be circumscribed with all types of regulations.

The industry has been able to meet increasing military and civilian requirements because of the backlogs which it had accumulated previous to 1942. Now the end of that road of abundance is here. A competent committee has found that the future productibility of the fields of District 3, which have supplied the bulk of the increased supplies of the past 18 months, is less than current output. In several other areas, because of the governmental restrictions in operations, production is the same that it was in late 1941, or less.

The only answer to this situation is adequate price, manpower and materials and the ending of useless regulations and red tape applying to the entire petroleum industry. After 2½ years of delays this is something that can't wait until after the election.

Many Instruments of War Come From Oil Research

by Henry D. Ralph

Behind daily war-bulletin references to effectiveness of flame-throwers, smoke screens and numerous other modern implements of warfare is the less spectacular and secret development of the equipment. This story deals with some of the recently unveiled secret weapons conceived chiefly by the petroleum industry and dependent on oil products for their effective operation on the battle fronts.

WASHINGTON. — The extent to which the oil industry has engaged in research and development work in furtherance of the war program was dramatically illustrated by the Standard Oil Co. (New Jersey) recently when it demonstrated three highly successful weapons of war which it developed for the Chemical Warfare Service of the U. S. Army.

A continuous smoke-screen generator, a vastly improved portable flame-thrower, and an incendiary bomb twice as effective as the magnesium bombs with which the Germans blitzed London were displayed in field demonstrations at northern New Jersey proving grounds to a large group of Washington and New York news correspondents and government officials.

All three weapons have proved their worth in battle and reports of their effectiveness have been trickling back for months, but the veil of secrecy was officially lifted for this demonstration. All three were devised by the Standard Oil Development Co. at the request of the Army and the Office of Scientific Research and Development, and required months of day and night work and heart-breaking disappointments.

Tribute to Oil Research

Although using oil products, none of the weapons involve applications which have any commercial counterpart, and the fact that the assignments were given to and successfully completed by Esso Laboratories is a tribute to the oil industry's progress in basic research.

Standard officials profess to know of no possible postwar commercial uses for these developments, though some may occur later. The smoke generator employs an oil-burning furnace, very similar to a domestic installation, with pumps which mix and atomize steam and an oil, spraying it out in an odorless and harmless mist so finely divided that it effectively blankets a large area for several hours.

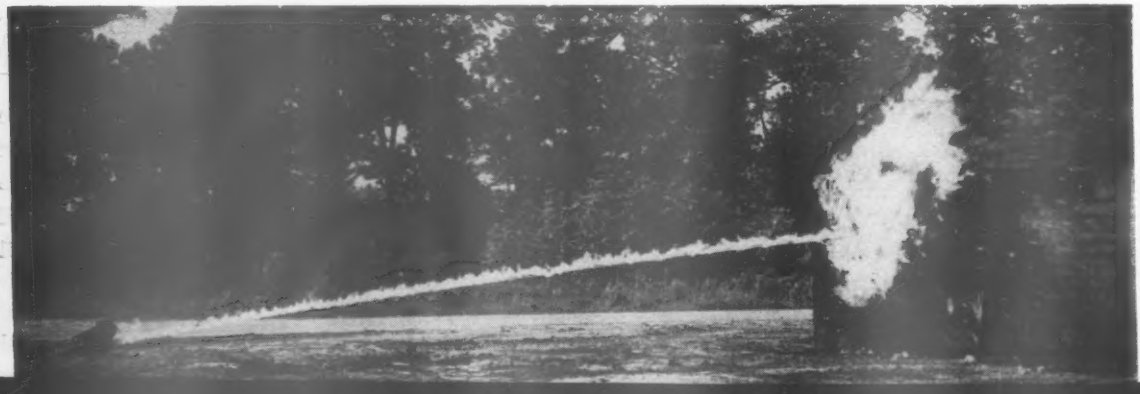
Both the flame-thrower and the fire bomb employ an oil jelly, ordinary motor gasoline thickened with a secret powder so that it has the appearance and consistency of apple jelly. It is ejected as burning gobs of goo which cling to any object, burning as intensely but with less of a flash than liquid gasoline. When applied from a flame-thrower strapped on a soldier's back this gel forming a slender "rod" is shot by compressed air two or three times as far as liquid, can be aimed into the narrow slit of a pill box, and can even be ricocheted around corners like a stream of water from a garden hose. Whereas the old flame-thrower threw only flame, the solidified gasoline strikes and adheres to an object still burning fiercely and far from consumed. In the form of an incendiary bomb the gasoline gel produces considerably less initial temperatures than the German magnesium and thermite bombs but it has twice the B.t.u.'s, pound for pound, burns longer, spreads over a larger area, and shoots itself into cracks and against walls where combustion conditions are the best.

Cooperation With Army

All three weapons look simple, but officials explained how their development was possible only because of a huge amount of basic research into the fundamental principles of combustion and other problems. Laboratory work and field testing in cooperation with the Army continued for many months.

In addition to reports of battle experience given by officers of the Chemical Warfare Service, the effectiveness of the weapons was demonstrated by Esso technicians and CWS troops. The party stood on a hillside and watched half a dozen truck-mounted generators fill an entire valley with artificial white fog within a few minutes, and stood in this fog as it came from a generator, unable to see an arm's length but experiencing no irritation or odor. They saw flame-thrower troops sneak up on "enemy" pill-boxes and in a few seconds burn away protecting underbrush and gut the gun-ports with liquid fire. They saw the fire bombs shot from mortars (simulating a fall from a plane) pierce the roofs of demonstration buildings typical of enemy target construction and envelop the whole structures in flames within a few minutes.

An Army Chemical Warfare Service flamethrower, the M1-A1, in a simulated attack on a pill box. The advantage of thickened fuel for reaching into the gun ports is evident



Complete List of Field Increases

(Continued from page 56)

Pool and county—	Increase (cents per barrel)
Florence, Marion	35
Fox Bush, Butler	35
Garden, Butler	35
Gelwick, Butler	20
Gettysburg, Graham	25
Graber, McPherson	20
Graham, Cowley	20
Grand Summit	35
Gueda Springs, Cowley	25
Haller, Ellis	25
Halstead, Harvey	20
Hamilton, Greenwood	35
Haverhill, Butler	25
Heiken, Ellsworth	35
Hinchman, Greenwood	35
Hollis, Greenwood	35
Hower, Cowley	25
Jackson, Greenwood	35
Keighley, Butler	35
Keller, Greenwood	35
Kramer-Stein, Butler	35
Kriley, Rocks	25
Kurich, Rocks	20
Lamont, Greenwood	35
Leon, Butler	35
Lerado, Reno	35
Lost Springs, West, Marion	25
Lyon, Harvey	35
Lyons, Rice	35
Madison, Greenwood	35
Mahiney, Russell	35
Malins, Elk	35
McCullough, Butler	25
McPherson, McPherson	25
Mills, Elk	35
Mohannah, Cowley	35
Morrison, Clark	35
Murphy, Cowley	25
Nohl, Russell	20
Olson, Cowley	35
Otter Creek, Cowley	35
Padgett, Sumner	20
Peabody, Marion	25
Penokee, Graham	20
Pierce, Butler	35
Pippes, Greenwood	35
Polhamus, Greenwood	35
Porter, Elk	35
Potwin, Butler	25
Potwin, South, Butler	20
Rainbow Bend, Cowley	25
Reese, Greenwood	35
Reiken, Ellsworth	35
Reynolds-Schaffer, Butler	20
Robbins, Sedgwick	35
Rock, Cowley	35
Rock, North, Cowley	35
Ruder, Ellis	20
Sallyards, Greenwood	35
Scott, Greenwood	35
Seeley-Wick, Greenwood	35
Severy, Elk	35
Seward, Butler	35
Slick-Carson, Cowley	25
Smith, Cowley	35
Smock-Deiss, Butler	35
State, Cowley	35
Steinhoff, Butler	25
Teeter, Greenwood	35
Teichgraber, Greenwood	35
Thrall-Agard, Greenwood	35
Thurlow, Cowley	35
Tries, Cowley	25
Tuiney, Greenwood	35
Turner, Cowley	25
Udall, Cowley	25
Van Roy, Coffey	35
Virgil, Greenwood	35
Virgil, North, Greenwood	35
Walker, Elk	35
Weathered, Cowley	20
Weaver, Butler	35
Webb, Elk	35
Welch, North, Rice	25
Wellington, Sumner	25
Wherry, Rice	20
Wiggins, Greenwood	35
Wilkerson, Greenwood	35
Willard, Greenwood	35
Winfield, Cowley	35
Yoder, Reno	35
Young, Butler	25

KENTUCKY

Pool and county—	Increase (cents per barrel)
Cairo, Henderson	20
Coryden, Henderson	20
Greenbriar, Henderson	25
Helbardsville, Henderson	25
Sebree, Webster	25
Spring Grove, Union	20
Zion, Henderson	25
All other pools in Kentucky except Gilmore, Poole, Reed, Robards, Smith Mills and Spottsville pools, Henderson County; Livermore pool, McLean County; Hitesville, Morganfield, St. Vincent, Uniontown, Utley and Wathen pools, Union County; East Poole and Pratt pools, Webster County	35

LOUISIANA

Pool and parish—	Increase (cents per barrels)
Bayou Bouillon, St. Martin	35
Bellevue, Bossier	35
Belle Isle, St. Mary	25
Bisteneau, Bienville-Bossier	35
Branch, Acadia	35
Caddo, Caddo	25
Carterville, Bossier-Webster	35
Converse, Sabine	25
Delta Duck Club, Plaquemines	35
Driscoll, Bienville	35
Edgerly, Calcasieu	20
Elm Grove, Bossier-Caddo	20
Homer, Claiborne	20
Lake End, Red River	35
Lake Hermitage, Plaquemines	35
Logansport-Joaquin, De Soto	20
Manifest, Catahoula	25
Oakland, Union	35
Perkins, Cameron	35
Pleasant Hill, De Soto-Sabine	25
Sibley, Webster	25
Simsboro, Lincoln	20
Welsh, Jefferson Davis	35

MICHIGAN

Pool and county—	Increase (cents per barrel)
Beaverton, Gladwin	35
Bentley, Gladwin	25
Birch Run, Saginaw	35
Bloomingdale, Van Buren	35
Casco, Allegan	35
Clare City, Clare	35
Columbia, Van Buren	35
Crystal, Montcalm	25
Dalton, Muskegon	35
Deerfield, Monroe	25
Diamond Springs, Allegan	35
Dorr, Allegan	35
Edenville, Midland	35
Edmore, Montcalm	35
Freeman, Clare	20
Grout, Gladwin	35
Hope, Barry	25
Hopkins, Allegan	35
Lakefield, Saginaw	35
Leaton, Isabella	25
Montegey, Allegan	35
Mount Pleasant and east extension, Isabella	35
Muskegon, Muskegon	35
Muskrat Lake, Van Buren	35
New Salem, Allegan	35
Overisel, Allegan	35
Pine River, Gladwin	25
Porter, Midland	20
Saginaw, Saginaw	35
Salem, Allegan	35
Sauble, Lake	20
Sherman, Isabella	35
South Akron, Tuscola	35
South Buckeye, Gladwin	35
South Tallmadge, Ottawa	35
Trowbridge, Allegan	35
Vernon, Isabella	25
Walker, Kent	35
West Branch, Ogemaw	35
West Hopkins, Allegan	35
Winfield, Montcalm	35
Wise, Isabella	20
Wyoming Park, Kent	35
Yost-Jasper, Midland	20

MISSOURI

Pool and county—	Increase (cents per barrel)
All pools, except Tarkio pool, Atchison County	35

MONTANA

Pool and county—	Increase (cents per barrel)
Border, Toole	35
Cat Creek, Petroleum	35
Kevin Sunburst, Toole	35
Pondera, Teton	35
Reagon Nose, Glacier	25
Sweet Grass Hills area, Toole	35

NEBRASKA

Pool and county—	Increase (cents per barrel)
Barada, Richardson	20

NEW MEXICO

Pool and county—	Increase (cents per barrel)
Anderson, Eddy	20
Artesia, Eddy	35
Aztec, San Juan	35
Dayton, Eddy	20
High Lonesome, Eddy	35
Rattlesnake, San Juan	35
Red Lakes, Eddy	25
Turkey Track, Eddy	25

NEW YORK

Pool and county—	Increase (cents per barrel)
All pools producing Pennsylvania Grade crude	75

OHIO

Pool and county—	Increase (cents per barrel)
All pools producing Pennsylvania Grade crude	75
All other pools	35

OKLAHOMA

Pool and county—	Increase (cents per barrel)
Ada, East, Pontotoc	35
Alabama, Hughes	35
All pools, Craig	35
All pools, Nowata	35
All pools, Rogers	35
All pools, Washington	35
Allen (shallow), Pontotoc	35
Almeda, Osage	35
Alsuma, Tulsa	35
Altus, Jackson	35
Arno, Creek	20
Asher, West, Pottawatomie	20
Avant, Osage	35
Avant, West, Osage	35
Avery, Lincoln	35
Aztec, Okmulgee	35
Backius, Osage	35
Bald Hill, Okmulgee	35
Baltimore, North, Okfuskee	35
Bandwheel, Osage	35
Barker, Osage	25
Barnes, Garfield	35
Barnsdall, Osage	35
Barnsdall, South, Osage	35
Barnsdall, West, Osage	35
Bartlesville, Osage	35
Bebee, East, Pontotoc	35
Beggs, North, Okmulgee	35
Beggs, South, Okmulgee	35
Beidleman, Okfuskee	35
Bethel, Seminole	35
Bethel, Northeast, Seminole	35
Big Horse, Osage	35
Bilby, Wagoner	35
Bird Creek, Tulsa	35
Birch Creek, Osage	35
Bixby, Tulsa	35
Blackwell, Kay	20
Boston, Osage	20
Boston, North, Osage	35
Bowring, Osage	35
Boyle, Muskogee	35
Boynton, Muskogee	35
Braman, Kay	25
Branstetter, Osage	35
Brinton, Okmulgee	35
Bristow, Creek	23
Bristow, North, Creek	36

Pool and county—	Increase (cents per barrel)
Bristow, West, Creek	35
Britton, Oklahoma	20
Brock, Carter	35
Broken Arrow, Tulsa	35
Brown, Garfield	35
Broyles, Payne	25
Bruce, Creek	35
Bruce, East, Creek	35
Bruner-Vern, Tulsa	35
Buell, Osage	35
Bulldog, Osage	35
Burbank (Osage), Osage	35
Burbank (Kay), Osage	20
Butler, Muskogee	35
Candy Creek, Osage	35
Carey, Okfuskee	25
Castle, South, Okfuskee	35
Clarita, Coal	35
Clearview, Okfuskee	35
Cleveland, Pawnee	35
Coalton, Okmulgee	35
Cole, Muskogee	35
Collinsville, Tulsa	35
Comanche, Stephens	35
Conservation, Pontotoc	35
Corine, Wagoner	35
Council, Muskogee	35
Country Club, Osage	35
Coweta, Wagoner	35
Cruce, Stephens	35
Cushing, Creek	35
Dalton, Osage	35
Davenport, Lincoln	35
Davenport, North, Lincoln	35
Dawson, Tulsa	35
Deaner, Okfuskee	35
Deep Fork, Creek	35
Dewey, Osage	35
Dilworth, Kay	20
Domes, Osage	35
Donnelly, Creek	20
Dora, Seminole	25
Duncan, North, Stephens	35
Duncan, West, Stephens	35
Ed Cox, Carter	35
Edgewood, Osage	35
Edna, Creek	20
Edna, East, Okmulgee	35
Elgin, South, Osage	35
Empire, Stephens	25
Enfisco, Osage	35
Enos, Marshall	35
Eram, Okmulgee	35
Fairfax, Osage	35
Falls Dome, Osage	35
Fields, Okfuskee	35
Fisher, Tulsa	35
Fitts, North, Pontotoc	35
Fitts, South, Pontotoc	25
Flat Rock, Osage	35
Flesher, Osage	35
Foraker, Osage	20
Forty-Five, Osage	35
Fox, Carter	20
Francis, West, Pontotoc	35
Frederick, Tillman	35
Garber, Garfield	35
Garber, North, Garfield	20
George, Wagoner	35
Gessman, Lincoln	20
Gillette, Wagoner	35
Gilliland, Osage	35
Glenn Pool, Creek	35
Goble, Wagoner	35
Graham, Carter	35
Gregory, Okfuskee	35
Gypsy Hill, Okfuskee	35
Gypsy Hill, Northwest, Okmulgee	35
Hallett, Pawnee	35
Hamilton Switch, Okmulgee	35
Hanbury, Comanche	35
Happy Hollow, Osage	35
Haskell, Muskogee	35
Hector, Okmulgee	35
Henryetta, Okmulgee	35
Healdton, Carter	35
Hewitt, Carter	25
Hickory Creek, Osage	35
Hickory Creek, South, Osage	35
Hickory Grove, Creek	25
Hobart, Kiowa	25
Hoffman, McIntosh	35
Holdenville, West, Hughes	35
Hominy, Osage	35
Hominy, East, Osage	35
Hominy Falls, Osage	35
Hominy, South, Osage	35
Independent, Creek	35
Ingalls, Northeast, Payne	25
Iron Post, Creek	35
Isom Springs, Marshall	35
Jenks, Tulsa	35
Jennings, Pawnee	35
Josey, Okfuskee	20
Kasishke, Osage	35
Kaw, Osage	20
Kellyville, Creek	35
Keystone, Pawnee	35
Kingston, Marshall	35
Konawa, Seminole	20
Konawa, East, Seminole	25
Konawa, South, Seminole	25
Langston, South, Logan	20
Lauderdale, Pawnee	35
Lawton, Comanche	35
Lee Dome, Osage	35
Leonard, Tulsa	35
Lincreek, Lincoln	35
Link, Muskogee	35
Loco, Stephens	35
Lovell, Logan	20
Lyons-Quinn, Okfuskee	25
Madalene, Osage	35
Madalene, East, Osage	35
Madill, Marshall	35
Manion, Osage	35
Manion, North, Osage	35
Mannford, Creek	35
Maramec, Pawnee	25
Markham, Payne	35
Marshall, Logan	20
Masham, Pawnee	35
Maud, Pottawatomie	20
Mehan, Payne	35
Mercer, Creek	25
Meridian, Logan	20
Milrey, Stephens	35
Montezuma, Okmulgee	35
Morgan, Okfuskee	25
Morris, Okmulgee	35
Mounds, Creek	35
Muskogee, Muskogee	35
Natura, Okmulgee	35
Nuyaka, South, Okmulgee	35
Nuyaka, Southwest, Okmulgee	35
New England, Osage	35
Nicoma Park, Oklahoma	20
Norfolk, Payne	35
Norfolk, West, Payne	20
Oakman, Pontotoc	35
Ochelata, North, Osage	35
Okemah, Okfuskee	35
Okemah, West, Okfuskee	35
Okesa, Osage	35
Okfuskee, Okfuskee	35
Oklahoma Central, Okmulgee	35
Okmulgee, Okmulgee	35
Olean, Creek	35
Olive, Creek	35
Olympic, Okfuskee	35
Oneta, Wagoner	35
Osage City, Osage	35
Osage City, East, Osage	35
Osage-Hominy, Osage	35
Osage, Jefferson	25
Overbrook, Love	20
Owasso, Tulsa	35
Page, Osage	35
Pollyanna, Okmulgee	35
Papoose, Hughes	20
Pawhuska, Osage	35
Pawhuska, West, Osage	35
Pershing, Osage	35
Pettit, Osage	35
Phillipsville, Okmulgee	35
Pickett-Prairie, Creek	35
Pine, Okmulgee	35
Pioneer, Osage	35
Ponca City, Kay	25
Pond Creek, Osage	35
Poor Farm, Creek	35
Prue, Osage	35
Quapaw, Osage	35
Rainola, Stephens	35
Ramona, Osage	35
Red Bank, Creek	20
Red Fork, Tulsa	35
Red River Bed, Tillman	35
Ripley, Payne	20
Robberson, Garvin	35
Sac and Fox, Lincoln	35
Sacred Heart, Pottawatomie	35
Sancho, Seminole	25
Sand Springs, Tulsa	35
Sapulpa, Creek	35
Sapulpa, South, Creek	35
Sasakwa, East, Seminole	25
Schulter, Okmulgee	35
Searight, East, Seminole	35
Seay, Jefferson	35
Seltzer, Wagoner	35
Seminole, East, Seminole	20
Sheldon, Okfuskee	35
Sheppard, Muskogee	35
Sholem Alechem, Carter	25
Simmons-Black, Okmulgee	35
Skedee, Pawnee	35
Skellyville, Lincoln	35
Skiatook, Osage	35
Slick, Creek	20
Spaulding, Hughes	20
Spaulding, Southeast, Hughes	35
Spencer, Okmulgee	35
Stillwater, Payne	25
St. Louis, East, Pottawatomie	25
Stone Bluff, Wagoner	35
Stroud, East, Creek	25
Summers, Okmulgee	35
Sunset, Osage	35
Swan, Seminole	25
Tatums, Carter	20
Tecumseh, East, Pottawatomie	25
Terlton, Pawnee	35
Terlton, North, Pawnee	35
Tibbens, Creek	35
Tidal-Osage, Osage	35
Tipton, Jackson	25
Tonkawa, Kay	20
Transcontinental, Muskogee	35
Turkey Mountain, Tulsa	35
Turley, Tulsa	35
Tuskegee, Creek	35
Velma, Stephens	35
Walker, Creek	25
Walker, West, Creek	35
Walters, Cotton	35
Webster, Wagoner	35
Weleetka, Okfuskee	25
Weleetka, South, Okfuskee	35
Wetley, Seminole	35
Wetumka, Hughes	20
Wetumka, South, Hughes	20
Wheeler, Carter	35
Wicey, Tulsa	35
Whitetail, Osage	35
Wilcox, Creek	20
Wildhorse, Osage	35
Wildhorse, North, Osage	35
Wildhorse, South, Osage	35
Woolaroc, Osage	35
Woolsey, Stephens	35
Wynona, Osage	35
Yeager, North, Hughes	20
Youngstown, Okmulgee	35

PENNSYLVANIA

All pools producing Pennsylvania Grade Crude	75
All other pools	35

TENNESSEE

All pools	35

TEXAS

Adami, Webb	35
Agna Prieta, Duval	35
Angleton, Brazoria	35
Appling, Jones	25
Aviators, Webb	35
All pools in Archer County Excepting Burns Ickert, Cooper, Hull Silk Sikes, Hull Silk Sikes Caddo, Kadane, Kadane Shallow, Mankins, Scotland, Scotland Mississippi lime and Vogtsberger.	35
All pools in Baylor County Excepting Rendham and Seymour.	35
All pools in Brown County	35

Pool and county—	Increase (cents per barrel)
All pools in Clay County ..... Excepting Antelope, Antelope Mississippi lime, Burns Browning, Burns Midway, Halsell, Hapgood, Joy Mississippi lime, New York City Strawn, Ross, Stephens, Watson and Wynn.	35
All pools in Coleman County .... Excepting Coker, Boyle, Goldsboro, Jim Ned, Novice, Novice North, Overall and Silver Valley.	35
All pools in Comanche County ...	35
All pools in Cooke County ..... Excepting Bindle, Bindle Ellenburger, Dangle, Fleitmann, Walnut Bend, Walnut Bend-Winger and Wilson.	35
All pools in Eastland County .... Excepting Carbon.	25
All pools in Erath County	35
All pools in Foard County ..... Excepting Johnson.	25
All pools in Haskell County	35
All pools in Jack County ..... Excepting Birdwell, East Grayson, Ellis, Hoefle, McDonald, Meyers, Peex, Peir, Wolfe and Worsham Steed.	35
All pools in Jones County ..... Excepting Akard, Appling, Avoca, Avoca North, Avoca West, Griffin, Grogan, Hardy, Noodle South, Sagles, Stitch, Strand, Triplett and Wimberly.	35
All pools in Montague County ... Excepting Benson, Bonita, Barners, Chapman-McFarlin, Clingingsmith, Dobson, Forestburg, Hildreth, Hults and Owens, Illinois Bend, Mueller, Mueller Caddo, Ringold, Rogers and Rogers, Sanders, Stoneburg and Turner.	35
All pools in Palo Pinto County...	35
All pools in Shackelford County. Excepting Joy, Nail and Roark-Nail.	35
All pools in Stevens County ..... Excepting Brownville, Donnell, Hill and Loving.	35
All pools in Taylor County ..... Excepting Bowles, Lake Kirby, Merkel, Reddin, Reddin Frazier and Trent.	20
All pools in Throckmorton County Excepting McKnight and Parratt.	35
All pools in Wichita County ..... Excepting Airport, Davidson, K.M.A., K.M.A. Ellenburger and West.	35
All pools in Wilbarger County .. Excepting Consolidated, Electra-Ellenburger, Fargo, Harrold, Main, Potts-Ellenburger, Rock Crossing (Canyon) and Rock Crossing (Ellenburger).	35
All pools in Young County ..... Excepting Allar, Allar Caddo, Anzac-Graham, Briar Creek, Burns Larimore, Burns Ragland Mississippi lime, Davis, Garvey, Halbert Caddo, James, Kerlyn Loving, Knight, Knox, Knox North (Caddo), Knox Mississippi lime, Upton McLester, Murray, Murray Caddo, Padgett Mississippi lime, Servell and Williamson.	35
Bateman, Bastrop	20
Bateman, King	35
Bee Creek, Caldwell	35
Bennett (W. S. Rotan), Fisher....	20
Bird Island, Kleberg	25
Blackwell, Coke	20
Bolivar, Denton	35
Bolt, Kimble	35
Bowles, Taylor	35
Brenham, Austin	35
Bruni, Webb	35
Bruni, East, Webb	35
Buchanan, Caldwell	35
Burdette Wells, Caldwell	35
Burnell, South, Karnes	20
Caesar, Bee	35
Camada, Jim Wells	35
Calliham, McMullen	35
Carbon, Eastland	35
Cedar Creek, Bastrop	35
Chapman Abbott, Williamson	35
Charamousca, South, Duval	20
Charco Redona, Zapata	35
Chicon Lake, Medina	35
Chiltipin, Duval	35
Clara Couch, Crockett	20
Clark, Guadalupe	25
Cole, West, Webb	25
Collinsville, Grayson	35
Colmena, Duval	20
Comitas, Zapata	35
Corsicana shallow, Navarro	35
Cowden-Crane, Crane	35
Crockett, Crockett	25
Cuellar, Zapata	35
Currie, Navarro	25
Dale, Caldwell	35
Dale, West, Caldwell	35
Damon Mount, Brazoria	25
Deep Rock, Andrews	25
Deupree, Bexar	35
Diamond Half, Goliad	25
Dobbs, Ward	25
Dunlap, Guadalupe and Caldwell	35
Eckert, Bexar	35
Ellison Young, Caldwell	35
El. Tangue, Starr	35
Emperor Deep, Winkler	20
Escobas, Zapata	35
Ezzell, Live Oak and McMullin...	25
Fairfield, Bexar	35
Fleitmann, Cooke	25
Fostoria, Montgomery	25
Fromme, Pecos	25
Frost, Starr	35
Garza, Garza	20
Gas Ridge, Bexar	35
Ginter, Angelina	35
Goldsmith, North, Ector	20
Grosbeck, Limestone	25
Halley, Winkler	20
Heyser, Calhoun and Victoria ...	35
Holbein, Jim Hogg	20
Huntington, Angelina	35
Humble, Harris	25
Hurdle, Upton	35
Jacob, McMullen	35
James, Young	20
Kermit, Winkler	35
Killam, Webb	35
Killam, North, Webb	35
Knight, Young	25
Knox, Young	20
Kohler, Duval	35
Lake Kirby, Taylor	35
La Reforma, Starr	25
Las Animas, Jim Hogg	25
La Vernia, Guadalupe	35
Lehn, Pecos	35
Lentz, Bastrop	20
Live Oak, Crockett	35
Loma Novia, Duval	20
Loma Vista, Duval	35
Lopez, Webb	20
Los Olmos, Starr	35
Luby Deep, Nueces	20
Luling Branyon, Guadalupe and Caldwell	25
Lykes, Webb	35
Lytton Springs, Caldwell	35
Manila, Jim Hogg	25
Masterson, Pecos	35
Matthews, Williamson	35
McMillan, Runnels	35
Mexia, Limestone	20
Minerva Rockdale, Milan	35
Mirando City, Webb	35
Mirando Valley, Zapata	35
Moore, Howard	25
Munson, McMullen	35
Mykawa, Harris	25
Netterville, Pecos	35
Noach, Williamson	35
Normanna, Bee	35
O'Connor McFaddin, Refugio	20
Oilton, Webb	35
Old Batson, Hardin	35
Orange, Orange	20
Overall, Coleman	20
Panola Co. (Bethany), Panola ...	35
Payton, Pecos and Ward	25
Pecos Valley L. G., Pecos	35
Pecos Valley H. G., Pecos and Ward	35
Peters, Duval	20
Plummer, Bee	25
Potter, Marion	35
Pottsboro, Grayson	35
Potts-Ellenburger, Wilbarger	25
Premont, Jim Wells	25
Pruett, Ward	35
Quleta, Bee	35
Rancho Salo, Duval	35
Rancho Salo extension, Duval ...	35
Randado, Jim Hogg	35
Rhodes, Cochran	35
Ricaby, Starr	35
Richards, Cochran	35
Richland, Navarro	25
Rio Grande, Starr	35
Riddle, Bastrop	20
Robinson, Duval	35
Roselyn, Harris	35
Rotan, Fisher	20
Royston, Fisher	20
Sadler, Grayson	35
Salt Flat, Caldwell	20
Sam Fordyce, Hidalgo	25
Sam Fordyce, North, Starr	20
Sand Hills, West, Crane	20
Sandia, Jim Wells	35
Saratoga, Hardin	35
Sarnosa, Duval	20
Scarborough, Winkler	20
Sharon Ridge, Mitchell and Scurry	25
Shearer, Pecos	20
Snyder, Howard	25
Somerset, Bexar and Atascosa ...	35
South Bosque, McLennan	35
South Liberty, Liberty	20
Southton, Bexar	35
Spiller, Guadalupe	35
Spindleton, Jefferson	20
St. Charles, Aransas	25
Taborg, Pecos	25
Taylor Ina, Medina	35
Tehuacana, Limestone	20
Telferner, Victoria	25
Thrall, Williamson	35
Trent, Taylor	35
Triplett, Jones	25
Tulsita, Bee	35
Walnut Creek, Caldwell	35
Ward, South, Ward	35
Waskom, Harrison	35
Webb Ray, Upton	35
West Andrews, Andrews and Ector	35
Westbrook, Mitchell	20
White Creek, Live Oak	25
Wortham shallow, Freestone	35
Van shallow, Van Zandt	35
Victoria, Victoria	20
Vincent, Howard	20
Von Ormy, Bexar	35
Yoast, Bastrop	35
Zaboroski, Guadalupe	35

WEST VIRGINIA

All pools producing Pennsylvania Grade crude	75

WYOMING

Big Muddy, Converse	20
Dewey, Weston	35
G. P. Lease, Carbon	35
Grass Creek, Hot Springs	20
Hidden Dome, Washakie	35
Horse Creek, Laramie	35
Iron Creek, Natrona	35
Kirby Creek, Hot Springs	35
Osage, Weston	35
Poison Spider, Natrona	35
Rex Lake, Albany	25
Simpson Ridge, Carbon	35
Spring Valley, Vinta	35
Teapot, outside Naval Reserve, Natrona	35
W. Mule Creek, Niobrara	35
W. Warm Springs, Hot Springs	25

Shallow Field in Southern Kentucky Receiving Intensive Development

by Anthony McCauley

ALBANY, Ky.—Clinton County is experiencing the most extensive oil development in its history. The present drilling campaign started early in January of this year and approximately 42 wildcat wells have been drilled. The showing from these tests is unusually good as 23 of these wells are commercial producers with 19 dry holes, or 56 per cent on the producer side. Hereafter the production curve will rise sharply as more wells will be drilled in the newly discovered pools.

Producing wells in this area average from 5 to 25 bbl. natural, and in a few instances as much as 40 bbl. have been completed.

The Granville zone of the Trenton formation is the principal producing horizon and is found between 350 and 600 ft. below the surface, depending on topography. This horizon is approximately 330 ft. below the top of the Chattanooga shale which, in this locality, is around 30 ft. thick. The shallow producing zone which I. J. Vawter discovered in his 2 Dickens heirs, lies between 190 and 240 ft. depending on topography. This horizon is locally known as the Corder sand, though containing lime, and the term sand is used as a producing level. This Corder lime is roughly 50 and 60 ft. above the Chattanooga shale and is stratigraphically directly above the Beaver sand which has been the payoff in the majority of the Wayne County fields. However, to date only small showings of oil have been found in the Beaver horizon of Clinton County.

Middle Trenton Section

In the new drilling to date slight showings of oil and gas have been found in the upper and lower Sunnybrook, which is middle Trenton in age. The Granville horizon lies between the upper and lower Sunnybrook about midway. It is a light-to-buff-colored dolomitic lime and varies in thickness from zero to as much as 30 ft. In many cases it produces only gas up to ½ to ¾ million feet daily.

As yet the structures of western and northwestern Clinton County are believed to be of small extent. However, very few of them have been thoroughly explored. The Knox dolomite possibilities in this area have not been scratched as very few of the wells have been drilled below the lower Sunnybrook or less than 1,000 ft. Should a future test go as far as 3,000 ft. some operators believe they would test the lower Ordovician possibilities.

The Granville lime so far is the best shallow production, and seems to hold up well under steady pumping. Cost of drilling runs from $1,500 to $2,000 per well.

Sam D. Jarvis, Illinois operator, has been granted a charter to build a pipe line leading out of Clinton County. As soon as production reaches 1,000 bbl. daily it is possible Jarvis will start building. Present production is about 500 bbl. There are about 12 independent operators drilling in this section at present with a number of others due in the next 30 days.

Speed Urged in Restoring Flow of Natural Rubber

WASHINGTON. — Declaring it probably will be 2 years after the first recapture of Far East rubber-producing regions before normal operations can be resumed, John L. Collyer, president of B. F. Goodrich Co., urged here last week a policy for "obtaining as much natural rubber as possible, and with utmost speed, when rubber areas begin to come again under Allied control."

It is of first importance to expedite receipts in this country of tree rubber, still vitally needed for combining with the now relatively plentiful synthetic, as plantation areas are recaptured, Collyer said. Equally important is "the need for sound policies to deal with the economic and political problems the gradual return of rubber will raise.

As to allocation, Collyer pointed out that allocation of rubber to the United Nations during the war has been a function of the Combined Raw Materials Board, and said that, "upon reoccupation, this board should continue to allocate both natural and synthetic rubber." He felt no change need be made till the end of the war in the present system of centralized purchase of natural rubber by each nation, and allocation to its rubber products makers.

As to specifications, Collyer said that although the increasing supply of natural rubber (in the period after the start of recapture of Far East territories) will tend to remove the necessity of wartime controls over ratios of natural, synthetic, reclaim and other elements in manufactured products, "it may be desirable that the natural-rubber content of finished products continue to be fixed for a while. But controls can be progressively eased and, as soon as possible, should be removed altogether."

Lindroth Made Secretary of Jersey's Executive Group

NEW YORK.—J. E. Lindroth has been elected secretary of the executive committee of the Standard Oil Co. (New Jersey), the company announced today. A. C. Minton, secretary of the executive committee for the past 11 years, and also secretary of the company, will devote his full time to administrative matters in the latter post.

Lindroth, who was also made an assistant secretary, had been assistant manager of the coordination department since 1933. He joined the company as an office boy in the manufacturing department in 1919.

In 1944 Lindroth was a member of the technical committee which spent 2 months in Venezuela studying refinery sites and transportation facilities. A member of the company's transportation committee for the past 5 years, he was made chairman of the committee in June 1943, a position he resigns with his present appointment.

DEATHS

Al Wysinger, 52, independent oil operator in Union County, Arkansas, since 1921, died of a heart attack July 4 at his fishing camp on Lake Enterprise, in that state. His home was in El Dorado.

E. E. Andrews, 83, whose oil career began in the Bradford field, Pennsylvania, died July 3 in Abilene, Tex. His operations carried him to Oklahoma, California and Texas. He was proration umpire at Big Spring, Tex., for 3 years.

William A. Gardner, 81, in earlier years an oil-well drilling contractor, died July 1 at Knox, Pa.

Jay W. Long, 42, Bradford, Pa., head of J. W. Long Oil Co., died July 1.

H. A. Kennedy, Sr., safety director of Root Petroleum Co., El Dorado, Ark., died July 4.

R. M. Harris, 49, a director of Palo Pinto County Oil & Gas Corp., died July 8 in Strawn, Tex.

Catalytic Dehydrogenation of Natural-Gas Hydrocarbons

by C. H. Riesz, T. L. Pelican and V. I. Komarewsky*

Single-pass dehydrogenation of n-butane, i-butane, propane and ethane has been carried out in the presence of a coprecipitated chromium oxide-alumina catalyst at 450° to 550° C. and atmospheric pressure. At these conditions equilibrium dehydrogenation concentrations were closely approached. The practicability of the coprecipitated catalyst is discussed.

NATURAL gas may be defined "as a gaseous mixture, generally of predominantly hydrocarbon composition, found in nature."[1] Since natural gas is often associated with petroleum, natural gas may contain all of the low-boiling hydrocarbons and compounds found in petroleum. In addition, carbon dioxide, nitrogen, helium, hydrogen sulfide, organic sulfur and other compounds may be found in natural gas. In this paper, methane, ethane, propane, i-butane and n-butane are arbitrarily designated as natural-gas hydrocarbons since these most universally constitute natural gas.

Up to the present, natural gas has not been utilized to the utmost advantage as a source of chemicals and chemical raw materials. Under the impetus of war needs, however, natural gas has played an important role in expanding production of vitally needed chemicals in a relatively short time.

Importance of Synthesis

The potential importance of natural gas as a source of chemicals can be realized from the estimate that the total United States production for 1943 of nine important chemical products could be synthesized from the recoverable ethane, propane, and butane content of natural gas known lost and wasted in 1941.[2] The hydrocarbons containing two to four carbon atoms per molecule are of special interest in the synthesis of a large number of chemicals and chemical products. However, in most cases these hydrocarbons must first be converted to a more active intermediate product before they are utilized in chemical synthesis. Of the intermediate products the most important are the mono-olefins. These may be produced from the corresponding hydrocarbons by catalytic dehydrogenation. The following reactions were studied in this work:

$$C_2H_6 \rightarrow C_2H_4 + H_2 \quad (1)$$

$$C_3H_8 \rightarrow C_3H_6 + H_2 \quad (2)$$

$$n\text{-}C_4H_{10} \rightarrow n\text{-}C_4H_8 + H_2 \quad (3)$$

$$i\text{-}C_4H_{10} \rightarrow i\text{-}C_4H_8 + H_2 \quad (4)$$

Catalytic dehydrogenation of the lower hydrocarbons was first investigated by Frey and Huppke, who employed a chromium oxide gel catalyst at 350° to 500° C.[3] This catalyst was found to be very active especially in the temperature range of 350° to 450° C. Their results as well as those of other investigations with the various hydrocarbons are tabulated in Table 1. The data are also presented in graphical form in Figs. 1, 2 and 3. It has been found that the activity of chromium oxide gel decreases above 400°-450° C. probably as a result of the crystallization of the amorphous oxide. Morey and Frey claim to have overcome this difficulty.[4] Dementeva and coworkers investigated several gel catalysts of the chromium-oxide type in the temperature range 500°-550° C.[5,6] In general considerable side reactions were found in their work although the catalyst maintained a fair activity for a long period of time.

Some of the disadvantages which are found with the chromium oxide gel catalyst can be overcome by producing the active oxide on a support of alumina. Impregnation of alumina with chromium salts by Grosse and Ipatieff[7] and by Burgin, Groll and Roberts,[8] produced a rugged,

TABLE 1—SINGLE-PASS CATALYTIC DEHYDROGENATION OF NATURAL-GAS HYDROCARBONS

		Concentration of dehydrogenated products in exit gas, vol. %						
Hydrocarbon:	Temp. °C.	Equil.	Gel Cr_2O_3	Impreg. Cr_2O_3 on Al_2O_3	Impreg. Cr_2O_3 on SiO_2 gel	Oxides of Mo, Zn, Mg	Other Catalysts	Co-pptd Cr_2O_3-Al_2O_3
n-Butane	450	15.2	13.3(3)	.....	12.2(9)	15.0(9)	7.0†(9)	15.6
	500	24.5	.....	19.9(7)	17.7(9)	16.2(9)	13.0†(9)	24.2
	525	29.2	19.5(6)	.....	.....	.....	.....	...
	550	34.3	15.2(6)	23*(8)	.....	.....	16.5†(9)	28.1
	600	41.9	18.1(6)	29.9(7)	.....	.....	.....	...
i-Butane	450	16.4	15.9(3)	.....	15.8(9)	8.5	13.8†(9)	16.4
			17.0(4)				13.5‡	
	500	26.3	13.0(5)	18.4(7)	24.0(9)	18.0	17.2†(9)	27.3
	525	28.7	27.7(5)	.....	.....	.....	.....	...
	550	35.9	.....	24.7(7)	28.5(9)	24.0	.....	...
				27*(8)				
	600	42.7	.....	33.3(7)	.....	.....	.....	...
Propane	450	9.1	6.3(3)	.....	.....	.....	.....	7.1
	500	16.4	11.7(3)	.....	.....	.....	.....	13.9
	550	26.1	9.4(6)	.....	.....	.....	.....	24.7
	575	31.1	13.2(6)	20.5*(8)	.....	.....	.....	...
	600	35.3	.....	21.3(7)	.....	.....	.....	...
Ethane	450	2.4	2.3(3)	.....	.....	.....	.....	1.4
	500	4.9	4.0(3)	.....	.....	.....	.....	2.3

*Calculated from conversion data assuming no side reactions.
†Ammonium chromate, zinc and manganese nitrates on charcoal.
‡Platinized asbestos.

*Institute of Gas Technology, Chicago.

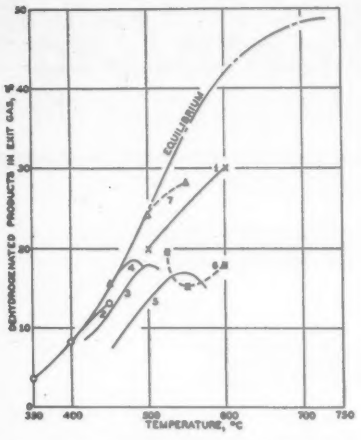


Fig. 1: Single-pass catalytic dehydrogenation of n-butane

Curve 1—Grosse and Ipatieff, Cr_2O_3 on Al_2O_3. Curve 2—Frey and Huppke, Cr_2O_3 gel. Curve 3—Dunstan and Howes, Cr_2O_3 on SiO_2 gel. Curve 4—Dunstan and Howes, Oxides of Mo, Zn and Mg. Curve 5—Dunstan and Howes, Oxides of Cr, Zn and Mn. Curve 6—Dementeva et al, Cr_2O_3 gel. Curve 7—This paper, Cr_2O_3—Al_2O_3.

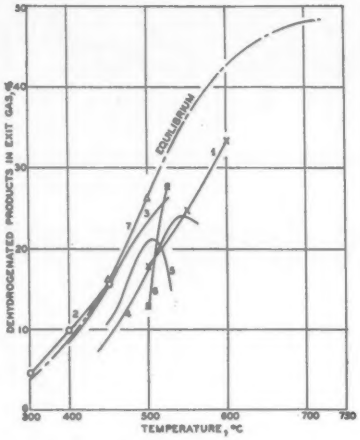


Fig. 2: Single-pass catalytic dehydrogenation of i-butane

Curve 1—Grosse and Ipatieff, Cr_2O_3 on Al_2O_3. Curve 2—Frey and Huppke, Cr_2O_3 gel. Curve 3—Dunstan and Howes, Cr_2O_3 on SiO_2 gel. Curve 4—Dunstan and Howes, Oxides of Mo, Zn and Mg. Curve 5—Dunstan and Howes, Oxides of Cr, Zn and Mo. Curve 6—Dementeva et al, Cr_2O_3 gel. Curve 7—This paper, Cr_2O_3—Al_2O_3.

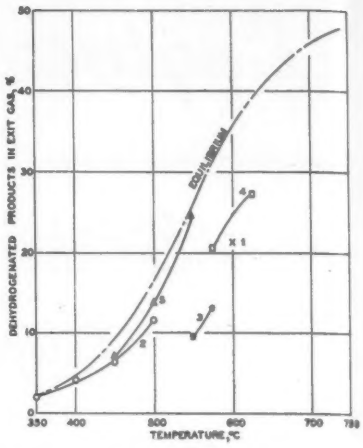


Fig. 3: Single-pass catalytic dehydrogenation of propane

Curve 1—Grosse and Ipatieff, Cr_2O_3 on Al_2O_3. Curve 2—Frey and Huppe, Cr_2O_3 gel. Curve 3—Dementeva, Cr_2O_3 gel. Curve 4—Burgin, Groll and Roberts, Cr_2O_3 on Al_2O_3. Curve 5—This paper, Cr_2O_3—Al_2O_3.

low-priced catalyst which dehydrogenated the lower paraffins in the temperature range 550°-650° C.

The dehydrogenation of n and i-butane by means of a large variety of catalysts was investigated by Dunstan and Howes.[9] The best results were obtained with ammonium chromate on silica gel and mixtures of molybdenum, zinc and magnesium oxides. Other catalysts which showed a fair degree of activity included ammonium chromate, zinc and manganese nitrates on charcoal, platinized asbestos, oxides of chromium, zinc and molybdenum. Many other catalysts for dehydrogenation may be found in the patent literature.[10] In summary the best solid-contact catalyst disclosed contain oxides of the transition metals of the 6, 5 and 4 groups of the periodic system. Chromium oxide, either alone or supported, seems to be the best catalytic agent.

Equilibrium concentrations for the dehydrogenation of the lower paraffins are presented in Fig. 4. These represent the maximum possible concentration for a particular temperature regardless of the catalyst. The curves are based on the calculations of Pitzer; restricted rotation in the carbon-carbon bond is assumed.[7] From Table 1 and Figs. 1, 2 and 3 it may be seen that equilibrium concentrations are approached in varying degree depending upon the catalyst. In general, the chromic oxide gel catalyst is satisfactory for obtaining equilibrium dehydrogenation at 450° C. and below. Alumina impregnated with chromium salts may be utilized at 500° to 600° C. but does not produce equilibrium dehydrogenation. It was thought that the development of a catalyst which was stable, active and capable of producing dehydrogenation of the natural-gas hydrocarbons with no side reactions at high temperatures would be of interest.

It has been demonstrated in many reactions that catalyst preparation is one of the most important factors in obtaining optimum results. A striking example of this is in the dehydrogenation of naphthene hydrocarbons. From thermodynamic and catalytic considerations cyclohexane should be dehydrogenated to benzene at 300° C. by means of a nickel catalyst:

$$C_6H_{12} \rightarrow C_6H_6 + 3H_2 \qquad (5)$$

It was found, however, that only by coprecipitation of nickel and aluminum hydroxides could a catalyst be prepared which performed the above reaction quantitatively at 300° C.[11] The function of the alumina was to maintain the nickel in a finely divided state and prevent sintering.

Therefore, it was decided to investigate the use of a catalyst prepared by coprecipitation of chromium and aluminum hydroxides for the dehydrogenation of the natural-gas hydrocarbons. The results obtained with this catalyst indicate that it can be advantageously used for this reaction in the temperature range 450° to 500° C.

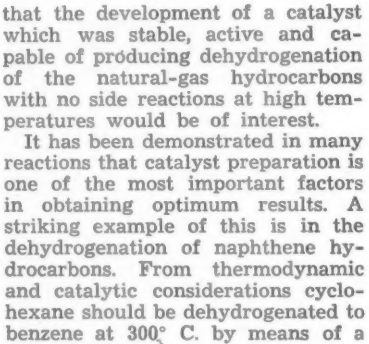


Fig. 4: Calculated equilibrium concentrations for dehydrogenation of natural-gas hydrocarbons (Pitzer)

Experimental Part

Apparatus.—The apparatus used in the work is shown in Fig. 5. Hydrocarbon gas contained in cylinders was admitted to the system through a needle valve. The flow was measured by means of a calibrated flow meter and, after passage through calcium chloride and ascarite, the gas was led to the catalyst tube. This tube was contained in an electrically heated furnace. The gas was preheated by means of glass beads and then passed down through the catalyst. In the experiments, from 20 to 80 cc. of catalyst were used. The reaction gases were led through an ice trap and then to a wet test meter. Gas samples were collected in a holder over saturated salt water.

Regeneration.—The catalyst was regenerated after an experiment by means of air. A nitrogen purge was employed to free the system of hydrocarbon before admitting the air. After regeneration, air was purged from the system by means of nitrogen. Then hydrogen was allowed to pass over the catalyst for about 30

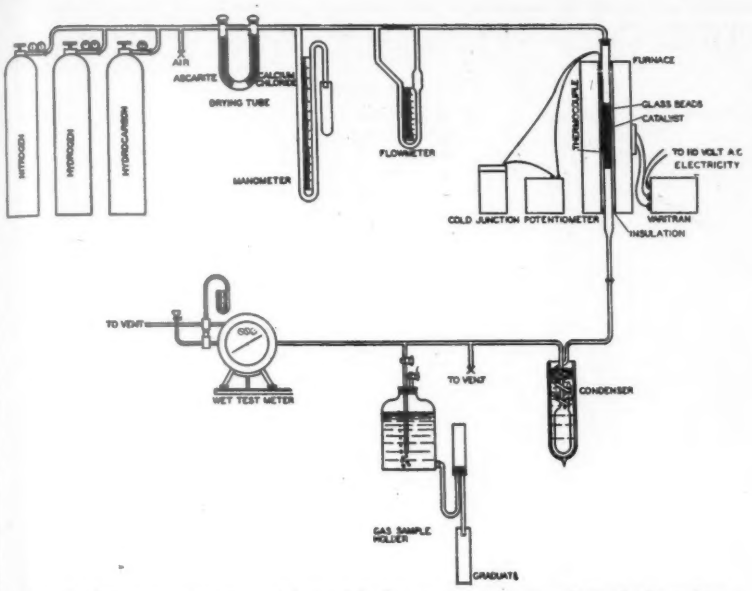


Fig. 5: Apparatus for the catalytic dehydrogenation of natural-gas hydrocarbons

minutes. Nitrogen was employed to remove the hydrogen from the system before hydrocarbon gas was admitted.

Hydrocarbon gases.—The n-butane and isobutane were from Phillips Petroleum Co. (purity 99 per cent). Propane and ethane were obtained from Ohio Chemical & Manufacturing Co. The propane had a purity of 99.9 per cent. The ethane was only 95 per cent pure and contained some unsaturates. After removal of unsaturates by means of fuming sulfuric acid, a saturated product was obtained of about 98 per cent purity.

Catalyst preparation.—The preparation of the catalyst has been described previously[13] bu will be described here for convenience of reference. To a solution of aluminum and chromium nitrates was added a solution of sodium hydroxide (5 per cent excess) to form a clear solution of sodium aluminate and sodium chromite at 0-5° C. The hydroxides of chromium and aluminum were precipitated simultaneously at 0-5° C. by the addition of the theoretical amount of nitric acid for neutralization. The precipitated catalyst was washed free of anion, dried and pilled. The composition of this catalyst by weight was 25 per cent chromia (Cr_2O_3) and 75 per cent alumina.

Gas analysis.—The products were analyzed by the Gockel method[18] and by low-temperature Podbielniak fractionation. In general, the procedure was to follow the course of the reaction by determining total unsaturates by means of bromine absorption. When maximum catalyst activity had been attained, a sample was taken for complete analysis.

Contact time.—Contact time was calculated according to a definition previously given.[14]

$$C.T. = \frac{P\,V\,t}{1040\,(273+T)\,M_R+M_P)}$$

Where

C.T. = contact time, seconds
P = average pressure, mm. of mercury
V = volume of catalyst, cc. (free space = 50 per cent)
t = duration of run, minutes
T = catalyst temperature, °C.
M_R = mols of hydrocarbon charged
M_P = total mols of products

Discussion of Results

Tables 2, 3 and 4 present results which were obtained for n-butane, i-butane and propane, respectively. Portions of the experimental data as well as pertinent equilibrium values are plotted in Fig. 6.

It may be seen that equilibrium concentrations were very closely approached in the temperature range 450° to 500° C. for these hydrocarbons. With n-butane and i-butane, unsaturated products in the exit gas agreed with calculated equilibrium concentrations. In the case of propane, the concentration of propylene was about 80 per cent of the calcu-

(Continued on page 96)

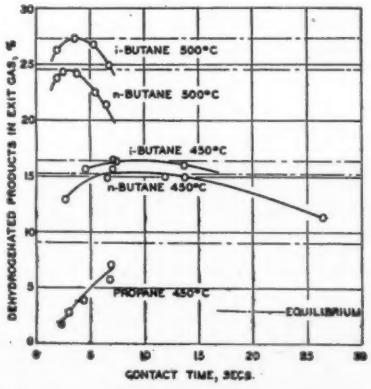


Fig. 6: Single-pass dehydrogenation of natural-gas hydrocarbons with chromia-alumina catalyst

TABLE 2
Dehydrogenation of n-Butane

Temp. °C.	Contact time, seconds	Dehydrogenated products in exit gas, vol. %
450	1.7	12.9
450	6.6	14.9
450	7.1	15.6
450	11.9	15.0
450	13.7	15.0
450	26.4	11.4
500	1.9	23.7
500	2.5	24.2
500	3.8	24.1
500	5.4	22.5
500	6.5	21.4
550	1.7	28.1

TABLE 3
Dehydrogenation of i-Butane

Temp. °C.	Contact time, seconds	Dehydrogenated products in exit gas, vol. %
450	4.6	15.6
450	7.1	16.4
450	7.4	16.3
450	13.6	16.0
500	1.9	26.3
500	3.6	27.3
500	5.3	26.7
500	6.7	24.9

TABLE 4
Dehydrogenation of Propane

Reaction temp., °C.	450	500	550
Contact time, sec.	6.9	2.6	1.1
Exit gas comp., vol. %			
Dehydrog'ted products	7.1	13.9	24.7
Hydrogen	8.5	16.9	32.4
Methane	0.0	1.3	6.4
Ethylene	0.0	0.0	0.8
Ethane	0.0	0.5	1.6
Propylene	7.1	13.9	23.9
Propane	84.4	67.4	34.9

TABLE 5
Dehydrogenation of i-Butane at 450° C.

On-stream time, hours	Contact time, seconds	Unsaturates in exit, gas* vol. %
Catalyst not pretreated with n-butane		
1.33	7.4	11.0
2.20	7.4	11.1
2.87	7.4	11.3
Catalyst pretreated with n-butane for 3.5 hours		
0.42	7.1	17.3
0.75	7.1	17.2
1.03	7.1	17.0
1.46	7.1	17.2
3.27	7.1	17.2
3.43	7.1	17.2

*By absorption in bromine.

TABLE 6
Dehydrogenation of Propane at 508° C. and 2.6 Seconds Contact Time

On-stream time, hours	Dehydrogenated products in exit gas, vol. %
0.5	9.2
1.5	11.4
2.5	12.0
3.5	12.7
4.5	12.8
5.5	12.9
6.5	12.9
7.5	12.8

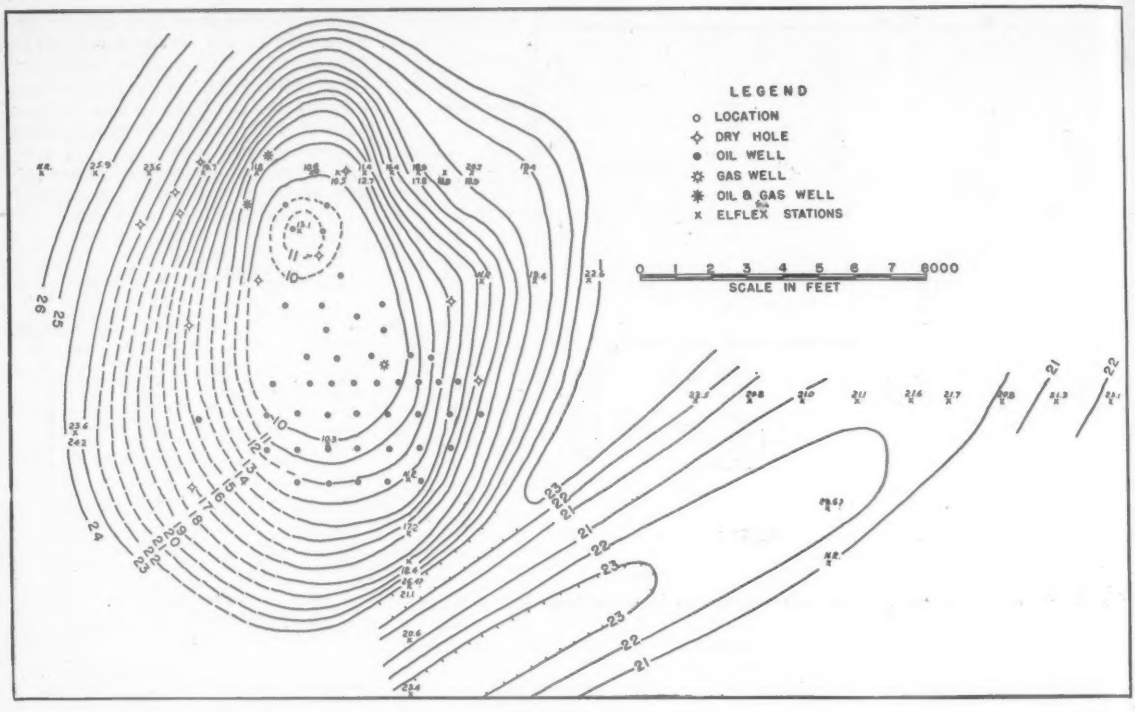


Fig. 1

Electrical Prospecting Method Used in Gulf Coast Search for New Reserves

by E. H. Short, Jr.

AN electrical prospecting method which offers new possibilities in the field of geophysical exploration has been gradually developed over a period of 4 years and is now being used in the intensive search for new reserves in progress along the Gulf Coast.

The method is based upon electrical-resistivity measurements. When it is considered that the one physical property of petroleum which differs most from the same property in associated earth fluids is its resistivity, the application of the method in the search for such fluids becomes logical.

By means of low-frequency commutated currents, measurements of the average resistivity of a section of earth may be obtained, in sections 800 to 1,200 ft. thick centered at predetermined depths which, on the Gulf Coast, range from 3,000 to 9,000 ft. The portion of the section containing petroleum has an appreciably higher resistivity than the portion where oil is not present.

Any means by which the search for and discovery of new petroleum reserves can be expedited is of particular importance to the oil industry at this time. The electrical prospecting method described in this article represents another contribution to the science of exploration.

Recent Surveys

The value of these electrical measurements was shown in a recent survey made by Elflex Co. for Independent Exploration Co. In referring to Fig. 1, contoured on resistivity contrast, it will be noted that the survey appears as a strong resistivity anomaly against a very constant background. Certain repeats were made during the survey, and several stations run between consecutive stations on the east-west line crossing the field to the north. (The original readings are written above the station locations. Repeat readings and the values on the interpolated stations are written below the station location.) These stations were measured 2 weeks after the first transverse, and offer an excellent example of the reproducibility and consistency of this type of work. Inasmuch as this field is fairly well delimited by drilling, no time was spent in making a complete outline of production. One station was measured to the southwest, off known production, and exhibited normal values. It should be mentioned here that contour values refer to resistivity contrast somewhere in a zone of about 1,000 ft. in thickness centered at predetermined depths. The predetermined depths depend upon the frequency of the exploring current used, which may vary from 0.25 to 2.00 ft. per second.

An earlier survey was made for Tide Water Associated Oil Co. in an area that has subsequently developed into a producing field. At the time of the survey, only one well had been drilled, which is indicated

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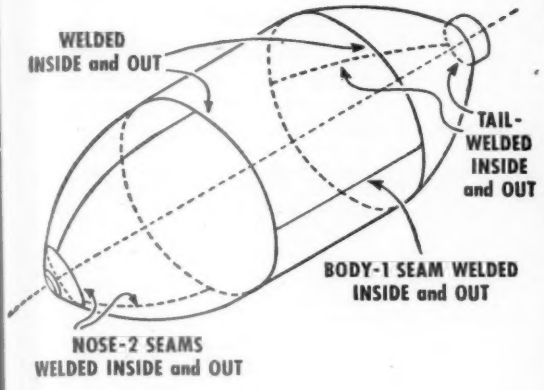

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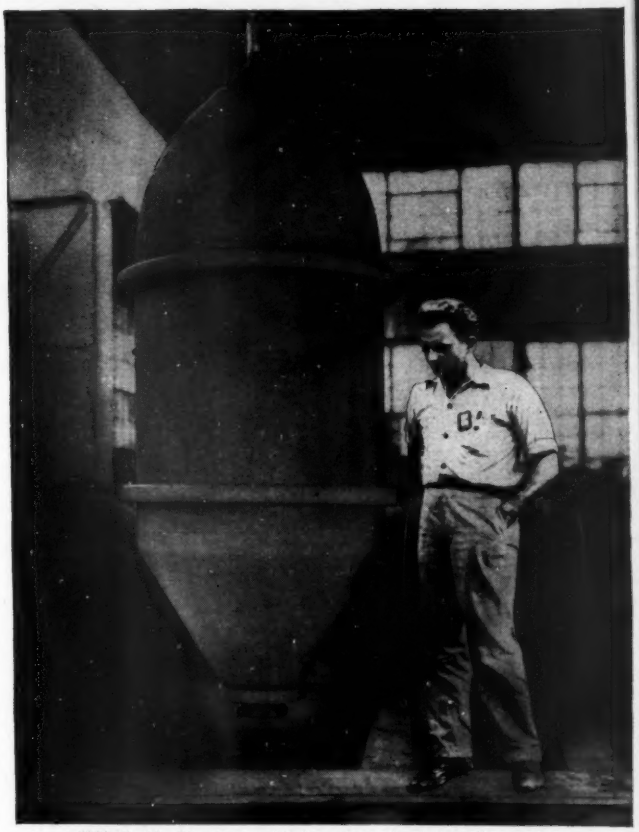

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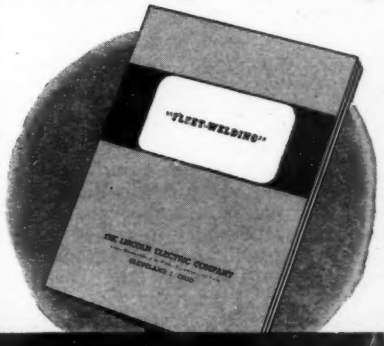

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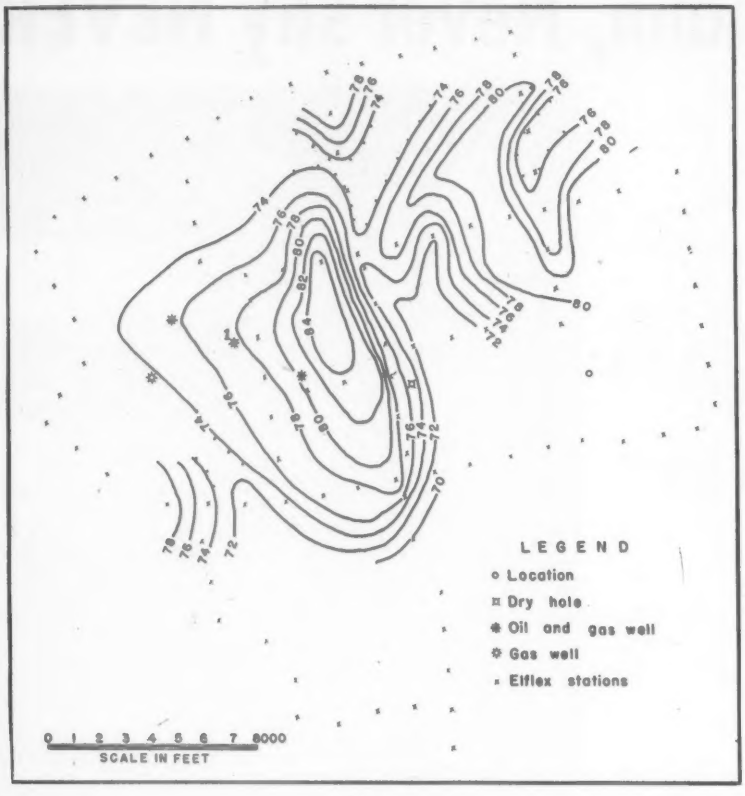


Fig. 2

on the map by the numeral 1. The deep resistivity anomaly in this region, shown in Fig. 2, has been confirmed by drilling. Attention is called to the dry hole obtained in the region of bunched contours to the right of the anomaly. This picture indicated excellent production possibilities within the 78 contour. This represents an arbitrary choice dictated by caution. The steep gradient to the east of the prospect is suggestive of faulting.

The values of the quantity contoured in Fig. 2 are not to be compared with those shown in Fig. 1. The quantities measured in the two examples are related, but are not identical. Each picture must be viewed against its own background. In this particular case the background value of the country was 20, plus or minus 2 points, as brought out by some 30 stations within 6 miles of the prospect. It should be explained that the stations which appear at the edge of Fig. 2 were experimental stations and not related to the picture as contoured. Another thing which might be confusing in comparing the two illustrations is the range of values, therefore it should be pointed out that the values shown in Fig. 1 are minus values, so that, for example, —10 is a higher resistivity value than the outermost contour of —23. In Fig. 2 the contour values are positive.

It appears that this type of anomaly obtained by electrical measurements is indicative of possible production through considerations entirely independent of the usual geological structure.

Field Survey Procedure

The Elflex field equipment consists of an instrument truck and two operators, and a cable truck also manned by two operators. When an area is to be worked, the survey procedure and also the location of the stations are determined at the company's headquarters in Houston. Stations are usually 1,500 ft. apart; however, those in charge of the field party may make deviations necessitated by local field conditions. When the trucks are spotted on location (Fig. 3) the cable is laid in a manner illustrated in Fig. 4. The electrodes are placed in small holes which are deep enough to insure good contact with the earth. Salt water is poured into the holes containing the current electrodes and fresh water in those containing the potential electrodes.

Theory of Operation

The Elflex was designed and developed largely by Dr. H. M. Evjen, in collaboration with Dr. W. B. Lewis, on the basic idea of Knute Evjen. The fundamental principles involved in measurements made with low-frequency commutated currents may be stated rather briefly. The effective depth of penetration depends on the frequency of the exploring current. Measure-

Fig. 3: Instrument truck showing operator burying an electrode

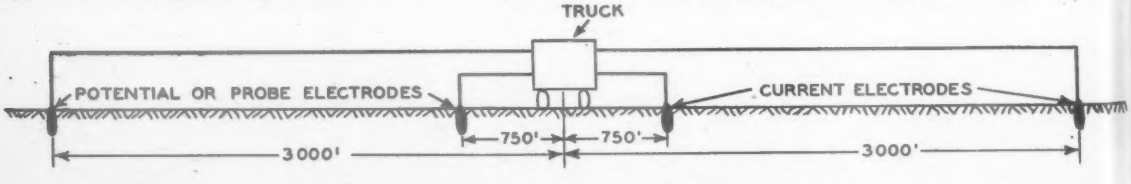


Fig. 4: Electrode arrangement

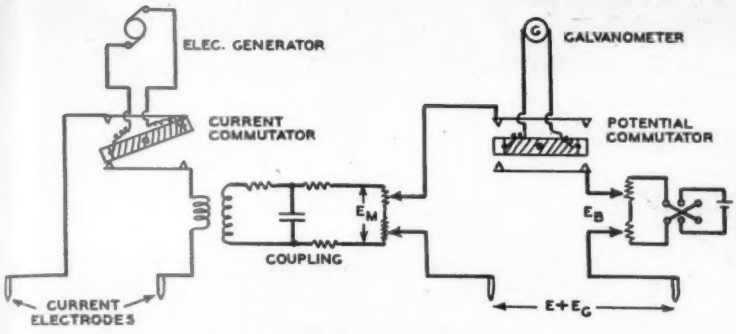


Fig. 5: Instrument diagram

Fig. 6: Interior of instrument truck showing Elflex apparatus. At right is the control box for frequency and current control. In the center are the commutators and speedometer for measuring speed of motor. Operator is shown making a balance with potentiometer

ments made with lower frequencies are appreciably influenced by deeper formations and as the frequency is increased the effects of the deeper formations become negligible. Thus the effective working depth can be controlled by maintaining the proper frequency.

Shallow effects are largely eliminated by making measurements in the gap interval between successive reversals of the current which is analogous to suppressing the early times on a seismic record.

The apparatus measures a potential produced by a unit current of definite frequency. Such a measurement has the physical dimensions of an impedance, and is a function of the earth's resistivity in a certain range of depths determined by the range of frequencies employed. Thus the observed readings themselves give the type of information desired, without the necessity of elaborate calculations.

Fig. 5 shows a schematic diagram of the apparatus, and this is also shown in Figs. 6 and 7, which are close-up photographic views taken inside of the instrument truck. The commutating switches in the current circuit and potential circuit are motor driven, operating synchronously but 90° out of phase, and so adjusted that when the galvanometer is connected into the potential circuit no current flows through the current electrodes.

Referring again to Fig. 5, the current causes a potential difference between the probe electrodes, and this potential difference alternates in sign with the same frequency as the exploring current. The coupling circuit furnishes a measuring potential, E_M, proportional to the earth current. This measuring potential alternates in sign with the same frequency as the current, and is used to balance out, and in that way measure the potential, E, produced by the current.

The potential E_G produced by natural earth currents is balanced by a bucking circuit, E_B, and a null balance is indicated by a galvanometer. It is of particular importance to mention that the commutators are operated out of phase so that when current is being put into the earth, the galvanometer is disconnected, and when the galvanometer is being used, no current is passed into the earth. This reduces the magnitude of the direct wave relative to the magnitude of the reflected wave as mentioned previously.

Since the electrical method of exploration is designed to indicate the average resistivity of a section of earth roughly 1,000 ft. in thickness and centered at a predetermined depth heretofore mentioned, it should be of valuable assistance in the detection of petroliferous beds, especially in cases where stratigraphic traps with no detectable structure are involved.

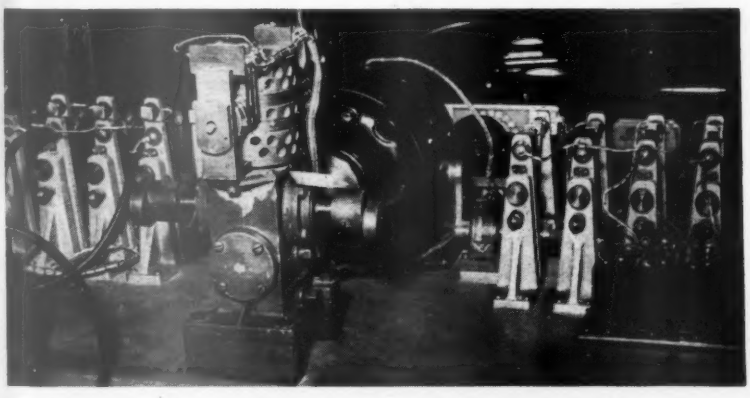
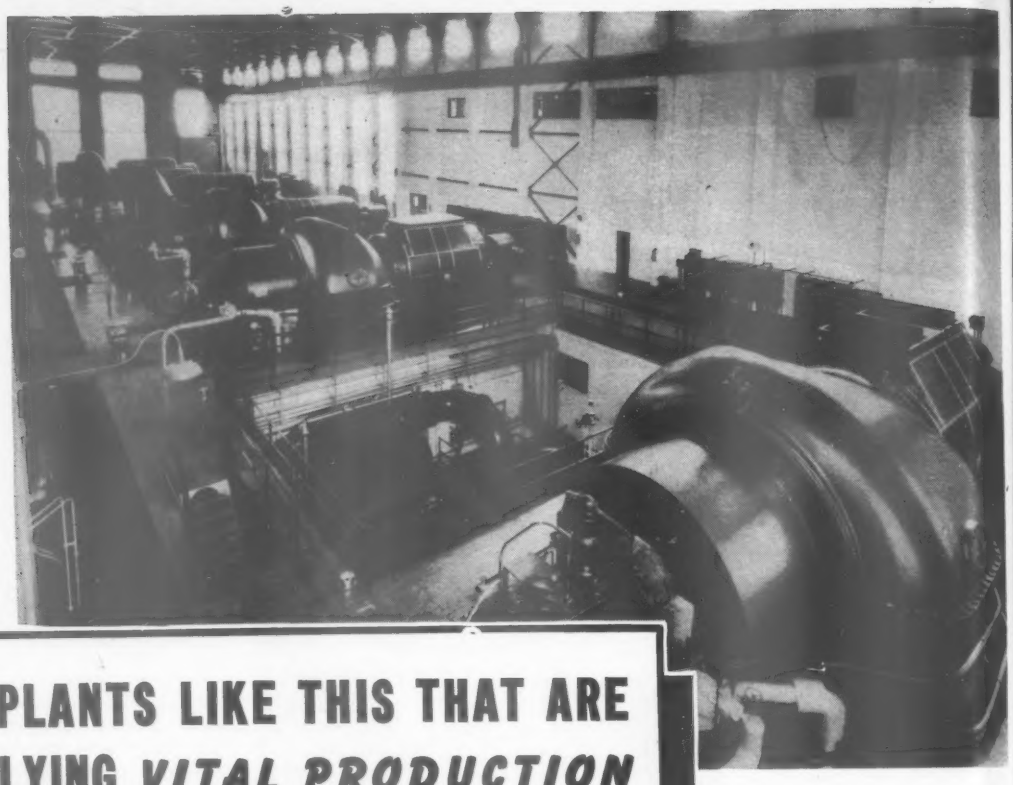


Fig. 7: Closeup showing detail of commutating mechanism

E. O. Derrick has been made vice president and sales manager of Mercury Oil Refining Co., Oklahoma City, succeeding **R. G. Cocanower,** who resigned recently. Derrick formerly was sales manager for Cushing Oil & Refining Co.

Capt. William C. Greenman, leaving active duty in the South Pacific, has been named director of naval petroleum reserves, succeeding **Rear Adm. H. A. Stuart,** who was placed on the inactive list after 10 years as director. Captain Greenman was commander of the cruiser Astoria, which was sunk in the battle of Guadalcanal. Wounded in that engagement, he was hospitalized in the United States and then returned to sea.



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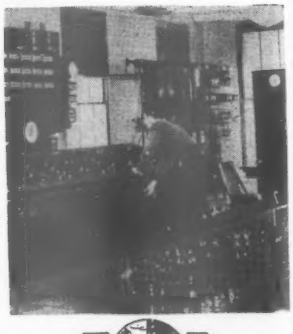

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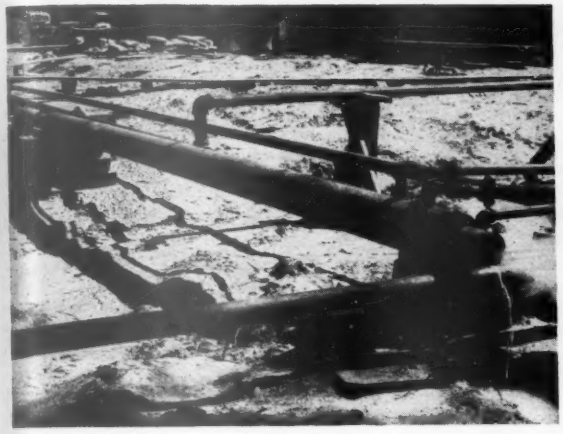
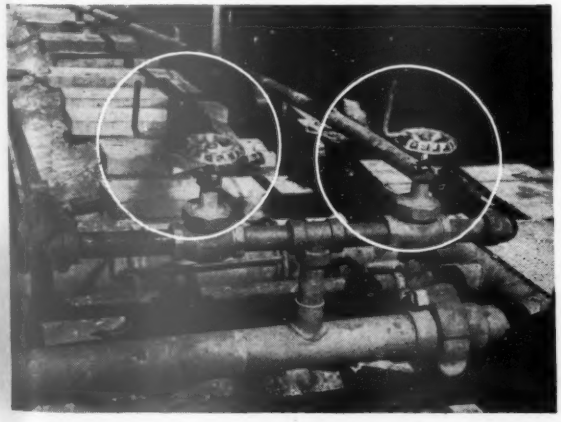


Boiler-Water Preheater on Exhaust Steam Line

A BOILER-WATER preheater on a steam drilling rig being operated by Loffland Brothers Co. in the Cranfield pool, Mississippi, consists of a shell, comprising a section of 12-in. casing about 30 ft. long, and containing a coil of 12 runs of 2-in. pipe, through which the feed water is circulated. The unit clamps on the end of the exhaust steam line with a Dresser coupling, the exhaust steam passing through the shell around the tubes providing the heating medium. Ends of the shell are closed except for the steam inlet and outlet openings. Steam outlet is through a short nipple extension, having the same diameter as the exhaust steam line to which the unit is coupled. Feed-water inlet and outlet connections to the coil are at the outer end of the preheater. The unit serves as a muffler.

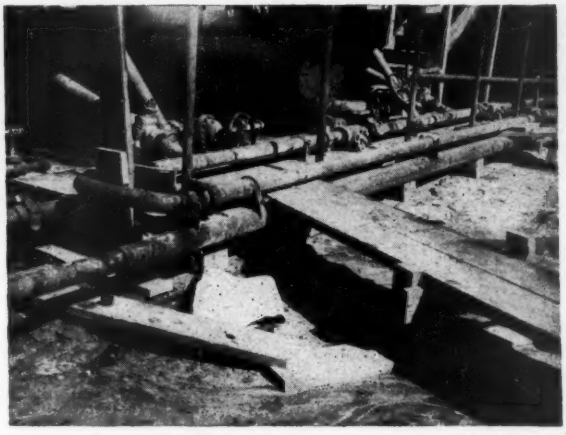
Extension Handle for Valve Wheels

TO facilitate the opening and closing of valves, one contractor welds extension handles to the turning wheels. The extension consists of a short length of small steel rod, one end of which is welded flat across the top of the wheel. The other end is bent upward at right angles at any desired point to form a handle. The arm is particularly advantageous on small valves, on which the turning wheels do not provide sufficient grip or leverage if slippery and tight turning.



Reversible Mud Pump Discharge Header

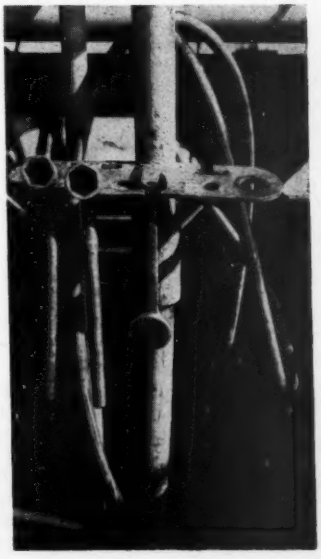
A UNITIZED mud-pump discharge-line header which can function in either direction without dismantling or changing of lines is provided on a steam rig now operating in Mississippi. The header, shown in the accompanying picture, comprises the two parallel lines in the foreground on the pump floor. In this installation, the rig is at the right of the pumps and mud-line connections are made at that end of the header with the front ends of the header lines connected with the "U" bend as shown. If it is desired at any time to set the rig up with the pumps and header turned around



it is only necessary to switch the U fitting to the opposite end of the header, leaving the exposed ends to be connected with the mud lines. The four connections, two at each end, are uniform, and employing couplings of a quick-change type, the switch can be made quickly without inconvenience. The header is so designed that the mud flow of either or both pumps can be directed through either of the two lines.

Rack for Pump Wrenches

WRENCHES used on mud pumps on rotary rigs are subject to misplacement unless some type of rack is provided. One drilling crew solved this problem by having a steel plate welded to the mud-line support at about shoulder height. The plate has circular holes for the socket wrenches with round handles and oblong holes with narrow slots in front for the open-end wrenches with the flat handles. The plate is permanently attached to the brace which is installed at the same point in relation to the pump at each location.



Oil-Well Pumping Practices—No. 40

Removal of Paraffin From Tubing

by J. Zaba

This installment concludes the series on "Oil-Well Pumping Practices," an exclusive feature of The Oil and Gas Journal. The series, initiated in the July 1, 1943, issue, represents a comprehensive coverage of the subject in all its phases, starting with discussions on the characteristics of oil reservoirs and the fundamentals of pumping operations. The last four installments have comprised an appendix dealing with subjects indirectly related to pumping.

ALL of the three possible groups of methods of removal of paraffin, and also a number of their combinations, are used for the purpose of removing the deposits of paraffin from tubing of pumping wells. The three groups of methods are the mechanical and thermal methods and those which involve application of solvents.

Mechanical methods[1,2,3]—The simplest method of removing mechanically paraffin from tubing and rods is by pulling the rods and removing paraffin from them. In many cases, however, this is not sufficient and scrapers, knives, or hooks have to be run to remove paraffin which is not taken care of in process of pulling the rods and the pump. There is a great variety of devices, commercially sold or improvised, which are used in mechanical cleaning. The devices may be run on rods or on wire lines of different types, depending on hardness of paraffin deposits.

The important part of the problem in case of pumping wells, particularly those of the stripper type, is the question of the removal of the scraped paraffin, to avoid packing of tubing, since usually there is not sufficient head available to flow the paraffin out. In case of soft deposits, swabs, with considerable clearance, are sometimes used for this purpose.

Thermal methods.—A number of different methods is employed to create within the well the heat necessary for melting of paraffin so it can be removed in liquid state. Steaming down the tubing or between the tubing and casing is used. Experiments were made, not quite successful, with introducing steam, or hot oil, through section of hollow sucker rods. Under this method the upper portion of the string, through the paraffin zone, is made of hollow rods, through which steam is introduced into the tubing. Hot water or hot oil is quite often employed. A method has been perfected in the East Texas field which permits use of hot oil without need of circulation or pulling of rods and tubing.[4] Pressure-release valve is installed in tubing about 1,000 ft. below the paraffin zone. Hot oil is then forced into the tubing displacing, through the release valve, the cold oil from tubing into the annulus between tubing and casing. The hot oil with its load of melted paraffin is then pumped out.

Special portable equipment has been designed consisting of steam generator, tank with oil, and arrangements for measuring the amount of oil pumped. The measuring is necessary to prevent hot oil with paraffin being forced out into annulus.

Other means of creating heat consists of use of chemicals, reaction of which results in temperatures needed for melting of paraffin, and of different types of electrical heaters. As far as electrical heating is concerned, a method of intermittent electrical heating has been developed which is being used with considerable success under difficult paraffin conditions in wells of the Texas Panhandle.[5,6,7]

Under the method of intermittent electrical heating tubing and rods are used as elements of an electrical heater. The tubing is insulated from the tubing head with an insulator of fiber-inserted neoprene. The tubing is also insulated from casing with insulators made of hardwood impregnated with linseed oil. At the desired point in the well contact is made between tubing and casing, completing the circuit to the surface. The current is supplied from a direct-current generator unit mounted on a truck. The current is of high amperage and low voltage, and contact is made to the well head by means of removable cable. The tubing is used as a positive and the casing as a negative terminal.

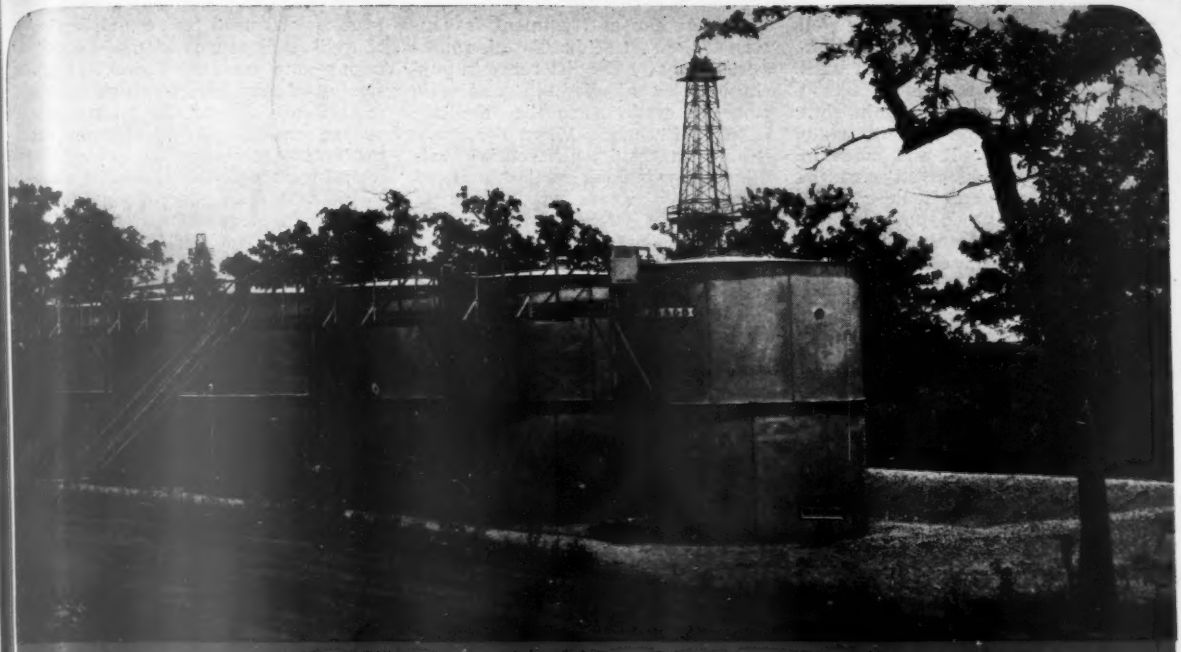
The amount of heat supplied to the well by this method can be calculated, if the resistance of the circuit is known. The resistance will vary from case to case, since it depends on a number of factors such as area of contact, amount of corrosion, condition of threads, etc. This resistance has to be, therefore, determined experimentally.

With known resistance of the circuit the treating procedure consists of connecting the generator unit to the well for a period of time necessary for melting of paraffin. The paraffin is then pumped out while the generator unit is moved to another well. Equipping of wells with insulators and contacts is done while well is pulled for routine servicing. The method proved very satisfactory and economical. No electrolytic action occurs since there are no points of high resistance and since all metals which come in contact are of the same composition. The electrolytic action could occur in cases of wells having oil-water emulsion in annulus between tubing and casing. Data available seem to indicate that the electrolytic action could take place in such a case when the emulsion contains 12 per cent or more of salt water. However, the contact is usually made above the fluid level.

Solvents.—In methods using solvents for removal of paraffin the specific gravity of the solvent used is of importance.[8] Methods generally are batch treating down the tubing or casing. In case of tubing treatment, if the solvent is too heavy it may travel down through the oil too rapidly for reaction to take place. If the solvent is too light it may remain floating on the oil without reaching the area to be treated. In case of casing treatment a too heavy solvent may settle below tubing perforations and remain in the well.

A number of solvents are used including benzol, gasoline, and commercially prepared solvents. The latter are heavy solvents with a carrying agent such as naphtha or gasoline to bring the mixture to the desired specific gravity.

Methods of solvent treatment are many depending on characteristics of the well and type of solvent used. In tubing treatment room must be made in tubing for the solvent. To accomplish this either the well is pumped off, or the standing valve is unseated, or the solvent is forced into the tubing through 25 to 30 ft. of small copper tubing, which is inserted into the tubing beside the rods. The treatment consists usually of introducing the solvent into



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the tubing and leaving it in the well for several hours with rods stationary. The well is then pumped until the solvent reaches the surface at which time the well is again shut down to permit the solvent again to settle through oil and come in contact with undissolved paraffin deposits. After several hours of shutdown, the paraffin is pumped out. In casing treatment the solvent is lubricated down the casing, washed with crude and pumped up through the tubing.

As in case of other methods of treatment, definite removal of paraffin from the well after the treatment is an essential requisite of the success of the procedure.

Paraffin Removal From Sand Face

Again, as in case of paraffin removal from tubing, mechanical, thermal, and solvent methods are used for removal of paraffin from the face of the sand. The problem is of course much more difficult than that of removing paraffin from the subsurface equipment. First, the existence itself of the problem is difficult to recognize. Presence of paraffin on the face of the sand manifests itself in decline of production; however, there are many other possible causes of decline of production. If no results are obtained from the treatment for paraffin it is difficult to determine whether the treatment was not successful or whether the diagnosis of the difficulty was wrong. The treatment itself is more difficult, requiring, in case of thermal and solvent methods, accurate placement of the reagent. Also, since deposition of paraffin on the face of the sand is primarily the problem of small pumping wells, the economics of the process have to be considered. In case of even most successful treatment the results may, in some cases, not justify the cost.

Mechanical methods consist of underreaming or scraping the face of the sand. Light shots are sometimes used to fracture the paraffin-covered face of sand. The thermal treatments may consist of use of steam, hot water or electrical heaters. Chemicals are quite often used, which upon reacting create the heat necessary for melting of paraffin. Solvents are introduced down the casing, this latter method being used with considerable success on the West Coast.[3]

Combinations of these methods are also employed. A process has been described in which action of both heat and solvent is combined.[9] Hot distillate is introduced down the tubing. After 15 minutes, the distillate is pumped out into a special tank equipped with steam coils, reheated and returned to the well. This process is repeated three times, after which the well is turned into stock tanks. As far as treatment is concerned the cost of distillate is represented only by the difference in purchase price of distillate and sale price of crude since the distillate is sold with crude. When the crude is sold on gravity-differential basis this cost would be further reduced since the distillate would tend to increase the gravity of crude. The method has been used with success on certain properties in the Texas Panhandle.

Surface Lines

As discussed in the preceding installment of this series the methods of preventing accumulation of paraffin are quite successful. If the methods fail and cleaning of lines is necessary, steaming, or circulating of hot kerosene or gasoline is resorted to. The lines may also be fired with crude oil. Use of commercial solvents would not compare favorably with other methods because of the cost involved. In properly designed surface lines mechanical "go-devils" are sometimes used.

Cleaning of paraffin from tanks is a subject only indirectly connected with the pumping operations and will not be discussed here. Numerous procedures have been developed and described in technical literature.[3,10]

Corrosion

Electrolysis, water, hydrogen sulfide and existence of loadings are the factors which contribute toward corrosion problems of pumping wells. Question of corrosion of sucker rods has already been discussed in Installment 6 of this series. Many of the considerations brought out in this discussion can be applied to question of corrosion of oil-well tubing since the tubing operates also under conditions of cyclic loadings. Data are available in technical literature on results of tests on corrosion of oil-well tubing.[11] The corrosion problem of pumping equipment is an economic one, received always a great deal of attention and was a subject of exhaustive research particularly along the lines of the modern electrochemical theory of corrosion.[12,13]

Remedial measures are many and vary with conditions encountered. Decrease of loadings by increase of size of rods or changes in characteristics of the pumping cycle, use of alloy steels, and steps to decrease the electrolytic action, such as use of zinc molds on sucker rods, are some of the preventive measures used.[14]

A majority of the corrosion problems of the subsurface pumping equipment are those resulting in the increased need for the routine servicing of wells, to remove and replace the corroded portions of equipment. There exist, however, those which lead toward need for reconditioning of wells, such as corrosion of oil-well casing and screens. Proper conditioning of mud before setting casing to decrease the mud's acidity and proper cementing jobs are important preventive measures for protection of casing strings. Use of special alloy metals is a most generally accepted practice for prevention of corrosion of screens.

Conclusion

Before concluding this series on oil-well pumping practices one more problem, closely related to the subject, should be mentioned. The problem is the question of predicting the need for pumping equipment for a flowing well, in other words, determination of the point in time when the well will cease to flow and application of mechanical lift will become necessary.

Solution of the problem must consider the behavior of the reservoir, the loss of energy in flow through tubing and the pressure necessary to deliver the oil from the well head to the stock tanks.[15] Pressure drop in sand and pressure drop in tubing for different rates of production can be determined from subsurface pressure surveys at different rates of flow. For any given rate of production the sum of these two factors, increased by the pressure necessary to bring the oil from the well head to the tank, represents the theoretical minimum reservoir pressure, with which the well is capable of flowing this particular production. Periodic bottom-hole-pressure surveys, determining the trend of decline of the reservoir pressure, would give approximate time limits within which the well would reach this minimum pressure.

The method assumes, however, that conditions governing the pressure drop in tubing remain unchanged. This makes any accurate, long-range predictions quite difficult. Thorough knowledge of characteristics of wells in a given common pool, combined with systematic bottom-hole surveys, furnishes quite often a basis for considerable accuracy of estimates. In only too many cases, however, combination of factors governing the extent of flowing life of a well is such that no estimate can be made which would tell the operator, with any degree of accuracy, when the flowing producer will become one of his most important and complex problems, a pumping well.

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3. Brad Mills, "Paraffin Formation and

(Continued on page 97)

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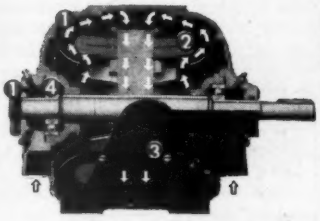

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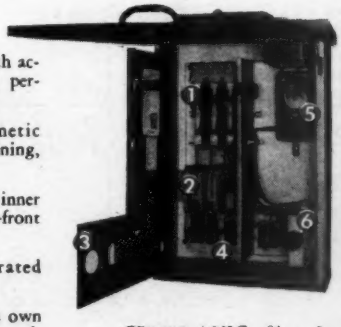

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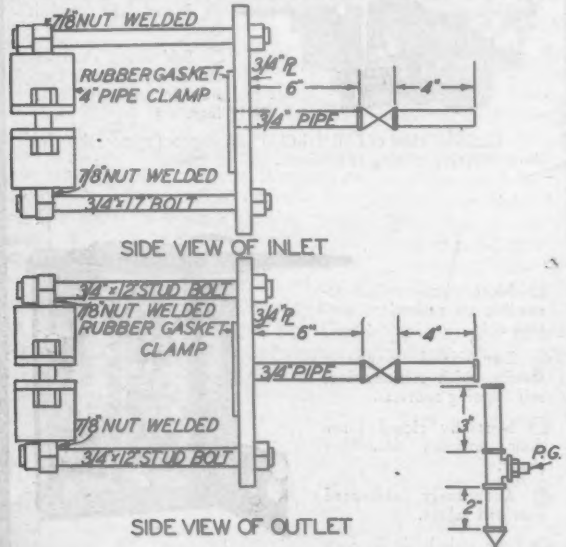
PLANT PRACTICES

Here are presented some of the suggestions submitted by employes of Humble Oil & Refining Co. under the company's "Coin-Your-Idea" program. These suggestions resulted in cash awards to the men submitting them. Additional ideas will be published in subsequent issues of the Journal.

Plug for Testing Pipe

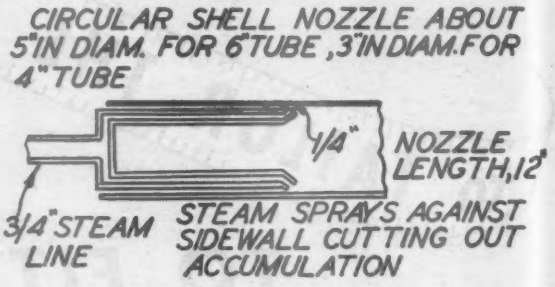
COMMON methods for testing plain pipe or any type of tube is to weld onto one end of the pipe a disk or flange to close that end completely then apply pressure at the other end to look for leaks. This device clamps a closure on one end of the pipe and an inlet device on the other, as shown in the accompanying drawing. A 4-in. pipe clamp for example—if building for another size pipe the dimensions will correspond to the pipe size—has two ⅞-in. nuts welded "sidewise" at the outer midpoint of each clamp half. Stud bolts ¾-in. diameter are screwed into these nuts; they are 12 in. long and fitted with suitable nuts at each end.



At their outer ends a plate ¾ in. thick with ¾-in. to ⅞-in. holes drilled opposite to receive the stud bolts is drilled in its center and threaded to receive a ⅞-in. pipe nipple, to which is fitted also a 4-in. heavy valve, with such extensions as the specific installation may require, to obtain a source of test pressure. A rubber gasket is placed on the inside face of this plate assembled on the stud bolts, its diameter being slightly greater than that of the pipe to be tested. A similar assembly is used at each end of the pipe when testing with any special attachments that may be desired. To test a pipe, the ends are clamped on, water or other test medium is admitted at one end, the valve is left open at the other end until all air is expelled, then is closed, and the test made. (Idea submitted by H. H. Kilgore, pipefitter.)

Steam Nozzle for Cleaning Return Tubes

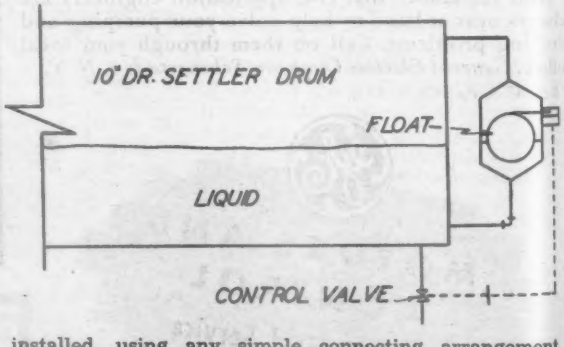
FOR steam cleaning tubes which are fouled and require severe treatment, the drawing shows a cleaner devised for improving this step. To a ¾-in. pipe is fitted a "yoke" or bend which starts from the larger pipe at right angles, and bends to opposite and parallel positions with the desired distance between ends. The ends are bent sharply and cut off so the openings are perpendicular to the surface of the tube through which the cleaner is passed. This yoke may be made up by fitting a ⅜-in. by ¼-in. tee to the end of the larger pipe, bending two threaded ¼-in. pipes to the required


CIRCULAR SHELL NOZZLE ABOUT 5" IN DIAM. FOR 6" TUBE, 3" IN DIAM. FOR 4" TUBE
1/4"
NOZZLE LENGTH, 12"
3/4" STEAM LINE
STEAM SPRAYS AGAINST SIDEWALL CUTTING OUT ACCUMULATION

90° and cutting off to suit the diameter and lengths required. Any other sizes may be used as needed. The larger pipe must be long enough to extend through the tube to be cleaned and with enough extra length to permit it to be handled. The pipe is attached to a steam hose, the nozzle is placed in the tube and passed slowly through, being rotated the while to reach all surfaces. The width of the nozzle tips should be 1 in. less than the inside diameter of the tube to bring steam close against the surface while it is still at high speed for maximum results. Even smaller clearances between nozzle ends and wall are permissible if movement of the nozzle is not so restricted. (Idea submitted by W. H. Craighead, distillation department.)

Level Control and Air Regulators On Doctor Settlers

THIS device enables the doctor sweeteners to have a steady flow of doctor solution returning to the reclaim tank continuously, giving better results in reclaiming the solution. The regular "kidney" float and regulator such as may be used on any material of low or intermediate temperature, such as those used on acid treaters, fractionator tower bottoms, etc., may be



installed, using any simple connecting arrangement such as that shown. The float is lifted by the rise of liquid inside the vessel, moving the pivoted lever which forces the piston downward and actuating the control valve to open it and allow liquid to flow out. (Idea submitted by J. B. Webb, refinery helper.)

Reconditioning Process Renews Gate Valves in Refineries

GATE valves in Union Oil Co. refineries which have become inefficient due to constant use are put through a systematic series of operations for reconditioning which renders them in many respects equal to new valves. The principal reason that such reconditioned valves provide excellent service without a trace of leaking or sweating is the careful attention that mechanics in the shops give to these fittings as they pass through the various departments.

When 25, 50 or more valves are removed from service they are shipped to the company shops, and are chained together in groups of 6 or 8 and lowered intact—with the wedges lifted from the seats—into a large vessel containing an active detergent maintained with steam coils at a temperature high enough to loosen paint, scale and baked-on oily residuum. When removed from this hot bath, they are rinsed clean with a stream of water at a high pressure and dried.

The valves are dismantled with wrenches so that studs and bonnet bolts can be salvaged for reuse. Hand wheels are removed and the bonnets pulled from the bodies so that the wedges, stems and packing glands can be separated. A competent mechanic inspects each individual part as they are separated from each other to determine whether the part can be reconditioned, or if it should be replaced with stockroom spares. Unless broken or damaged beyond the economical repair stage, each part is renewed, or repaired, by welding, machining or passing through some other process in the shops.

Departmental Equipment

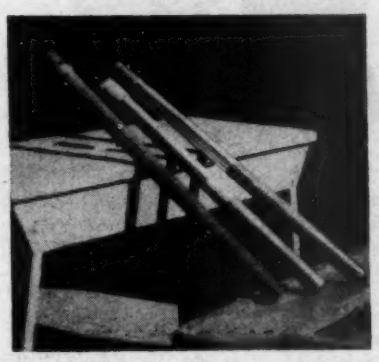
One department is equipped with machines for building up stems with sprayed metal, including a lathe and all material nearby for a complete job. Stems are brought to this department in quantities and flow through three separate processes. Stems are first buffed with a rotating wire brush to remove loose scale. The second step is turning down the body of the stem on the lathe until clean metal free of pits is uncovered. This step is in two parts, turning down and preparation for the sprayed metal. After turning down, a threading tool cuts a rough shallow thread approximately 25 to the inch. At each end of the threaded part of the stem, an undercut is made as a tie-in for the applied metal. When this step is completed, the stem is removed from the lathe and covered with tightly wrapped craft paper to prevent foreign matter, dust and moisture from touching the freshly prepared surface.

The third step is building up the stem with sprayed metal. It matters little whether the original stem is carbon steel, bronze, or stainless steel as it can be easily renewed to its original size and operating efficiency. If the stem is ordinary steel and future service requires a bronze surface, it can, for example, be covered with Tobin, or equivalent. Likewise, if service requires stainless, the carbon is sprayed with 18-8 or similar alloy. While applying the metal to the prepared surface of the stem, the metal gun rides back and forth as many times as the judgment of the operator dictates until the required thickness of metal is deposited.

Two Cuts Taken

After rebuilding the stem is turned down to standard diameter, requiring two cuts. The first is the usual rough cut but is taken with a shallow bite with a tool ground flat at the top. Any type of lip, which is frequently used for turning down a fresh rod, may cause slight gouging which results in a pitted surface. The finishing cut may be accomplished with the same tool, but geared to a finer cut so as to remove only enough metal to bring the stem to standard diameter and produce a surface which is practically smooth. Practice and judgment enable the mechanic to finish a stem to a working surface without extra steps, except in special cases. When a highly polished finish is required, an abrasive is used, such as coated cloth, applied in the usual manner.

The cost of rebuilding stems will vary with the price of the wire used with the spray gun. Up to the point of spraying, the stem out of one 6-in. gate valve, for example, costs the same as another. Normally, any stem turned out, regardless of the kind of finish applied, at about one-third the cost of a new stem.



Three similar gate-valve stems. Left stem when removed from body shows effects of wear and corrosion. Center stem is cleaned up and turned with 25 threads per inch ready for building up with bronze, carbon steel, or stainless steel. Right stem, originally carbon steel, but refinished by spraying Tobin bronze over prepared surface and turned and polished to standard size

Gate-valve stem chucked in lathe to be built up with Tobin bronze on steel. After being built to oversize, it will be turned down to standard size for reuse

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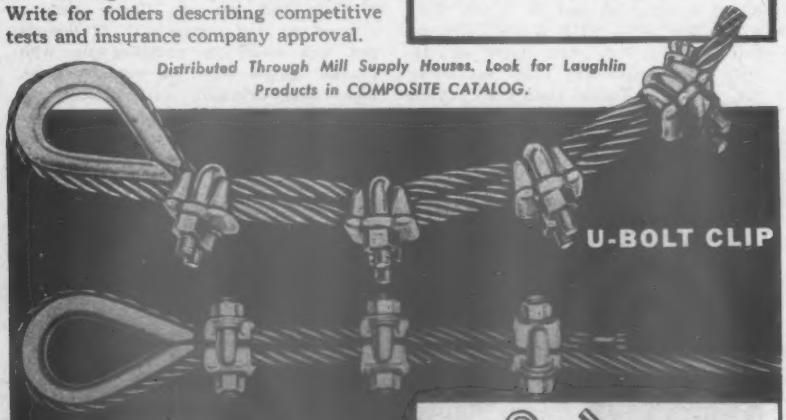

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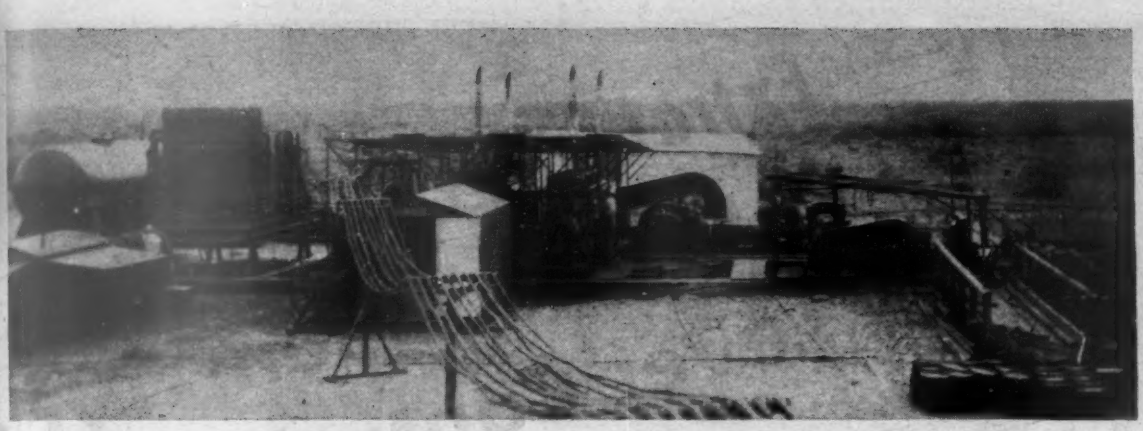


Diesel-electric rig of Rowan Drilling Co. Left to right are diesel oil tank, water cooler for engines, direct-current generator with wires to drilling motors, two diesel engines, mud circulating pump and small mud-mixing pump

Hard Drilling and Great Depths Increase Well Costs in Wheeler Ellenburger Field

by Joseph C. Gordon

PRACTICES being adopted by operators in the Wheeler Ellenburger field, eastern Winkler County, West Texas, are greatly expediting the drilling and completion of wells to depths below 10,600 ft. Due to the great depths, hard formations which slow up drilling, large and heavy-duty equipment used, and special precautions which must be taken to safeguard wells from formational hazards, drilling costs continue high. So far the depths at which the Ellenburger is being developed in this field are the greatest anywhere in the Permian basin.

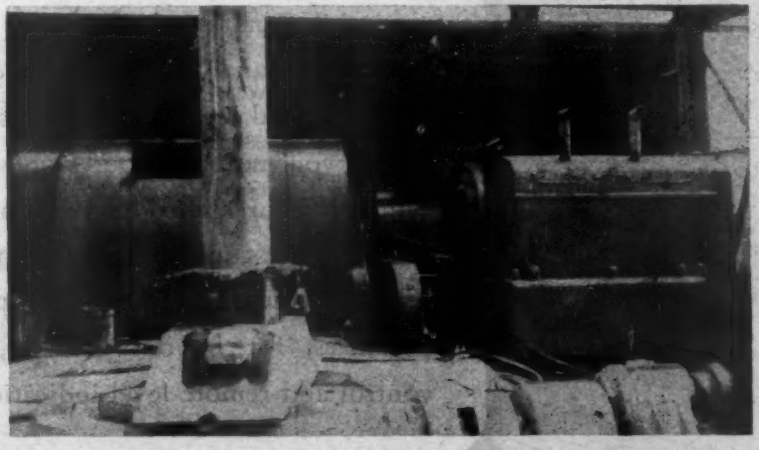
Five drilling rigs are running in the field with four wells having been completed to date. Since sufficient fuel and water for steam equipment are not available, mechanical power and electric rigs are operated. Operating companies include Superior Oil Co., Stanolind Oil & Gas Co. and Shell Oil Co., Inc. (jointly), Sun Oil Co., and Tide Water Associated Oil Co.

Tide Water 1 Wheeler is being drilled by Rowan Drilling Co. with a diesel-electric rig. Two 275-hp. diesel engines drive a 320-kw., 270-volt direct-current generator unit and also a 16-in. mud-circulating pump. A smaller mud-mixing pump and diesel-engine unit serve as a standby to the larger mud pump. Circulating water for these engines is cooled in a closed system consisting of a large radiator and cooling fan. Draw works is powered by electric motors and the rotary is driven from the draw works.

At Stanolind and Shell C-1 Wheeler, Loffland Brothers employ three 300-hp. engines to drive the draw works, rotary, an 18-in.-stroke mud-circulating pump, and a 15-in.-stroke mud-mixing and standby pump.

An electric rig is being used by Noble Drilling Co. at Stanolind and Shell B-1 Wheeler. Alternating current is obtained from a high-tension transmission system some miles from the well. The draw works is powered by two 200-hp. motors. The rotary is driven by a 150-hp. motor through a speed-reduction gear. Two 150-hp. motors drive an 18-in.-stroke mud-circulating pump. An auxiliary gas engine is installed to furnish power in case of interruption to electric power service.

Superior Oil Co. is drilling 1 Wheeler with a company rig. Draw works is powered by two 300-hp. gas engines. One 15-in. mud-circulating pump is driven by an individual 300-hp. gas engine and another pump of the same capacity is driven from the two engines on the draw works. The derrick has a 36-ft. base and is 156 ft. high. It is



Noble Drilling Co. draw works driven by two 200-hp. a.c. electric motors. At right is the auxiliary engine. Casing standing cemented

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FEATURES

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14 and 32 inches 4, 5, 6, 8, 10 and 15 feet.

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Specific gravity scale adjustable from .5 to 1.2 or from .8 to 2.0.

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set on a 10-ft. substructure. Two vibrating screens remove shale from the drilling fluid, and steel tanks are set up for mud pits.

The majority of the drilling derricks are 30 ft. by 136 ft. with 7-ft. substructures, rated at 400-ton. capacity. Crown blocks and traveling blocks are rated at 360-ton capacity and hooks in most cases are 300-ton capacity. Two blowout preventers are used, one for closing around the pipe and one for complete shutoff. Most of the rotaries are 27-in.

Wire-line service is severe and 1¼-in. lines are in general service. The number of round trips necessary to change bits, for coring, testing, and the handling of long casing strings, greatly increases the total ton miles of service required. From 6,500 to 7,000 ft. of drilling line is used per well. Six lines are usually strung to start the well, 8 lines are in use when completion depth is reached, and 10 are strung to run the oil string.

Number of Bits Used

The number of drilling bits has averaged 220, with variations due to depths and in formations encountered. As in Kermit and Keystone areas, the Devonian section is present and chert is encountered in that section and in the lower formations. One well drilled to 8,414 ft. with 96 bits, averaging 87.6 ft. per bit. Between 8,414 and 8,844 ft. the going was harder through the broken chert and 61 bits were run with an average of 7.2 ft. per bit. From 8,844 to 10,725 ft., 70 bits were used with an average of 26.8 ft. per bit. The frequent round trips from depths below 8,400 ft. greatly increase the time required for completion and resulting drilling costs.

Rotating speeds between 45 and 60 r.p.m. are general practice in drilling solid chert with 20,000 to 25,000 lb. weight held on the bit. Better progress seems to be made if bits are pulled before they are worn out of gage. Full-hole reamers are frequently run immediately above the bit with side cutters close to the bottom of the reamer. In many cases basket bits are run, after two regular bits have been used, to pick up chert which frequently breaks up in large fragments and decreases drilling progress. The 6⅝-in. drill pipe usually is employed in drilling the 12½-in. hole to setting point of the 9⅝-in. intermediate string of casing set between 3,550 and 3,800 ft., and 4½-in. drill pipe from that point to completion depth. Three 30-ft. collars are run with the 4½-in. drill pipe.

All wells are equipped with vibrating screens or rotating shale separators and the mud pits used vary in size from two small pits, the suction pit having a capacity of two-thirds of the hole, to two 5-ft. by 8-ft. by 60-ft. pits.

To start the hole, water with clay or bentonite is mixed. Surface casing (13⅜-in.) is being set between 200 and 300 ft. In the red beds, water is added and the hole makes some good mud which is usually carried at 10 lb. When the salt section is reached the fluid becomes saturated from the formation or salt is added to saturate the drilling fluid and reduce dissolving of salt from the formation with subsequent enlargement of the hole. Zeogel may be added to stabilize the mud by counteracting the flocculating effect of the brine and to increase the viscosity. This salt water mud usually is carried at 10.5 lb., funnel viscosity 30 to 35.

Completion of Wells

The salt water mud is discarded after the intermediate casing string is cemented. The casing is tested with fresh water; pits and system are cleaned of salt, and a fresh water mud is mixed with bentonite. Mud weight below this casing is carried at 9.5 lb., funnel viscosity 35 to 45, water loss 10 to 20 cc. At approximately 7,700 ft., Impermex may be added to reduce water loss in the shale encountered below this depth and mud is carried at 9.8 to 9.9 lb., funnel viscosity 45 to 50 and water loss 2 to 5 cc. This mud may be carried through the chert and Ellenburger to completion depth. Caustic and quebracho may be required to regulate the pH and maintain it at 12 or higher. In this stage of drilling the water loss should be reduced to 2 cc. if possible.

Mud conditioning is hampered somewhat while drilling the chert because of the high percentage of time for round trips to change bits, during which time circulation cannot be maintained. Cost of mud in one completion was approximately $25,000 and for a more recent completion, $15,000 or $1.39 per foot drilled. Operators in this area are mud conscious and their engineers and those of the sales organizations are cooperating with drilling personnel to keep the drilling fluid in good condition at the lowest cost.

After completion depth is reached, the 5½-in. oil string is run and cemented through the Ellenburger and well above with over 1,000 sacks of cement. When cement is set, casing is gun-perforated opposite the selected portion of the productive formation, tubing is run, and 10,000-lb. test tubing head and control valves installed, and mud replaced with water and the well swabbed in through the tubing. One well has been acidized with 2,000 gal.

Cost of completions in this field will continue to be high until drilling progress below 8,400 ft. can be materially accelerated.

A view of one of many plants designed and constructed by Petroleum Engineering, Inc., in the past 15 years of continuous service to the industry. *Petroleum Engineering, Inc. Offices: Tulsa and Houston.*

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Cleaning Paraffin from Flow Lines in Mississippi Field

by Neil Williams

THE formation of paraffin in flow lines of Wilcox sand wells in the Cranfield field, near Natchez, Miss., is so rapid that the lines must be cleaned frequently to keep them open. Some paraffin collects in the upper part of the tubing but this is not unusually troublesome, and the tubing is kept clean by occasional running of paraffin knives. Depositions which collect in the lines, however, present another and more serious problem.

Excessive paraffin formation starts in the lines about 50 ft. from the well and continues to the stock tanks with the greatest accumulations occurring in the line from the separator to the tanks. Within 2 or 3 days the accumulations will become so great as to interfere with production of a well.

Since well pressures are not sufficiently high to drive a go-devil or cutters through the lines, the paraffin cannot be removed mechanically. This calls for the application of heat to melt the paraffin and take it into solution.

Effective results are being attained by California Co., sole operator in the field, by running hot oil through the lines periodically. A small oil heater is provided for this. It is installed permanently on a 2-in. bypass line located between the well and a point on the main 2-in. flow line where the paraffin starts to form. Whenever paraffin begins to accumulate in the line the well production is directed through the bypass and heater, and the hot oil dissolves the paraffin and cleans the walls of line.

Design of Heater

The bypass line installation is made since it is not desired, nor necessary, to operate the heater or run the oil through it continuously. Normally, the heater is used only a few hours at a time two or three times per week. Since the practice has been followed there has been no evidence of paraffin accumulating in the lines.

Although any heater could be used, the one installed (shown in the accompanying picture) was designed by the operators. It is of simple construction, consisting of an outer shell, made from a section of 10-in. pipe about 80 in. long, set up vertically, with a 4-in. flue rising through it from the fire box, and extending out the top. The shell, through which the oil passes, is closed at the top around the flue, and about 20 in. above ground, a false bottom is placed, providing the fire box in the lower end. The burner was taken from a household gas cooking stove. The cold-oil inlet is located near the bottom of the shell just above the fire box. Hot-oil outlet is at the top. A small outlet line also is fitted in the bottom to drain the heater when not in use.

Flow-line heater installation in Cranfield field, Mississippi

Heating required is not sufficient to incur appreciable gravity losses in the oil run. Also, since the heating is only at intervals and for relatively short periods, the volume of oil that is subject to heating and possible incidental gravity losses is not great.

The main flow line from the well to the separator is buried to minimize temperature variations due to changes in atmospheric conditions, and for protection. In the installation shown in the accompanying picture, this line passes beneath the far ends of the two heater-bypass-line connections, and at right angles to them. The three small valves, one each in the ends of the two heater-line connections and one in the main flow line between them, which control the course of the flow, are barely visible.

Dehydrogenation of Gas Hydrocarbons

(Continued from page 69)

lated equilibrium value. For ethane about 50 per cent of the theoretical value of ethylene concentration was obtained.

In all experiments at 450° and 500° C. it was necessary to allow the reaction to undergo an induction period before maximum catalyst* activity was reached at a given contact time. The period of induction varied with the reaction conditions and, in addition, increased with the particular hydrocarbon being dehydrogenated in the following order: n-butane, i-butane, propane, ethane. It was found that the induction period could be reduced by passage of n-butane prior to the dehydrogenation of the other hydrocarbons. An example of this may be found in Table 5 for the dehydrogenation of i-butane at 450° C. and 7 seconds contact time.*

At 500° C. the induction periods were shorter; for example, propane required an induction period of about 4 hours. (Table 6.)

It was found that at the optimum and shorter contact time for a given temperature, the dehydrogenated products consisted almost entirely of the expected monoolefins according to Equations 1, 2, 3 or 4. Thus, complete Podbielniak fractional distillation and absorption analysis of the products from the propane experiments showed few side reactions at 450° and 500° C. (Table 4.)

At 550° C. side reactions occurred and the selectivity of the catalyst for dehydrogenation was decreased. These facts are clearly demonstrated in the dehydrogenation of propane.

*During the induction period, a small amount of carbon is deposited upon the catalyst and acts as a promoter for the dehydrogenation reaction. Cyclohexane also could be used to deposit carbon and shorten the induction period.

(Table 4.) At 450° and 500° C. the reaction is without appreciable side reactions, i.e., products other than propylene and hydrogen are not formed in an appreciable amount. However, at 550° C. considerable methane and some ethane and ethylene are formed; also the ratio of hydrogen to propylene is appreciably greater than 1.0, an indication of carbon deposition on the catalyst. Because of the carbon deposition only relatively short on-stream periods (about 2-3 hours) were possible at 550° C. Also, it was noted that operation at this temperature shortened the life of the catalyst probably due to a change in catalyst structure at this temperature. However, in spite of these limitations, equilibrium concentrations were rather closely approached. (Figs. 1 and 3.)

The results obtained with the coprecipitated chromium oxide-alumina catalyst have been included in Table 1 and Figs. 1, 2 and 3 for comparison with other catalysts. For n-butane and i-butane, equilibrium concentrations were achieved by coprecipitated as well as by other catalysts at 450° C.; at 500° C., however, only the coprecipitated catalyst attained equilibrium concentrations. Similarly, with n-butane at 550° C. and with propane at 450°, 500° and 550° C., a closer approach to equilibrium has been obtained than with other catalysts.

The practical importance of the coprecipitated catalyst is apparent. Gel catalysts are active at low temperatures but present at least two practical difficulties, namely relatively short life and mechanical instability. On the other hand, although impregnated catalysts possess long life, are rugged and inexpensive, they are characterized by requiring high temperatures for satisfactory conversions and short on-stream periods. Therefore, in a stationary catalyst bed, special alloy tubes and valves are required which not only must withstand high temperature but also alternately oxidizing and reducing atmospheres as regeneration or dehydrogenation occurs. By the use of a coprecipitated catalyst, the reaction temperature may be lowered to 450°-500° C. where by elimination of side reactions, long on-stream periods are possible, and by approaching equilibrium closely, high yields are attainable.

Acknowledgment

Acknowledgment is due to Miss Frances L. Estes for assistance in this work.

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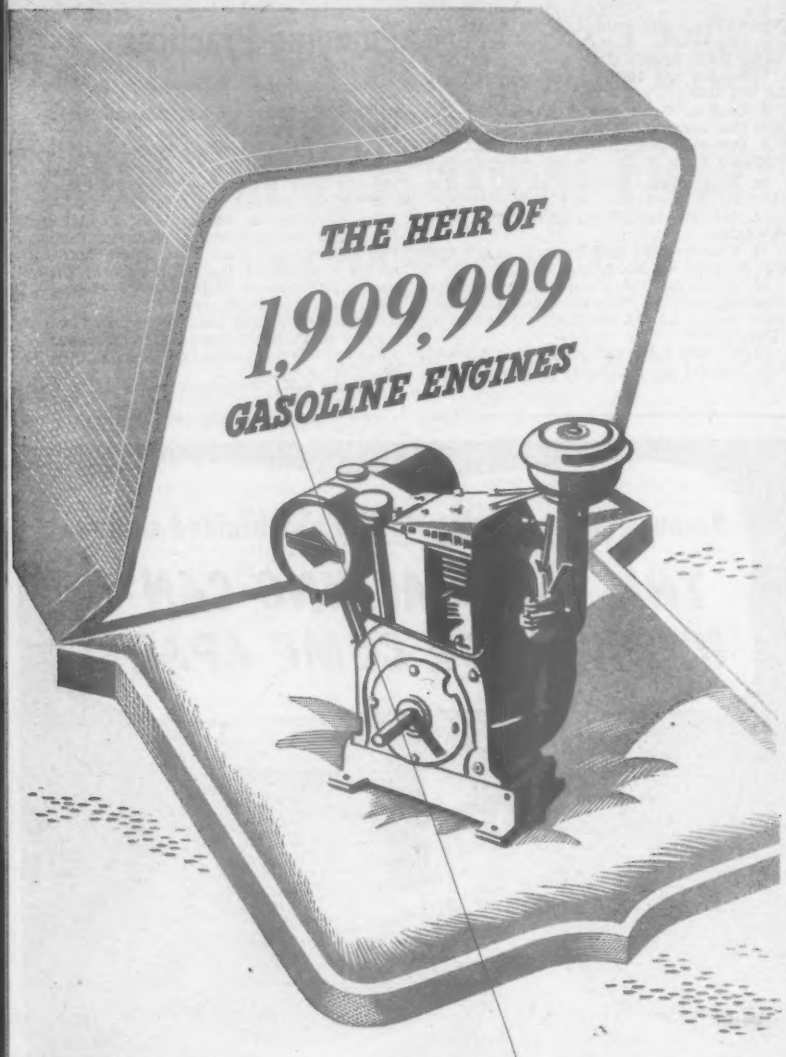

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Errata

No attempt is made to correct the minor typographical errors. The following list includes only major errors noted, which, if not corrected, could perhaps confuse those who filed this series as a reference.

Installment 7.—August 12, 1943, page 72, Column 1:

Expression: C = calibration constant (lb.) should read C = calibration constant (lb. per inch of height of card).

Installment 10.—September 2, 1943, page 43, Column 1:

Formula for effective plunger travel should read $S_P = S_R \frac{B}{A}$ instead of $S_P = S_R \frac{A}{B}$.

Installment 11.—September 9, 1943, page 60, Column 2:

Expression: d = setting depth of pump, feet, should read L = setting depth of pump, feet, also formula: $A = \frac{S_P E a_r}{10.39}$ should be $A = \frac{S_P E a_r}{10.39 g L'}$.

Installment 17.—November 4, 1943, page 52, Column 2:

Formula $HP_r = \frac{\frac{1}{8} W_r + 25 \times N}{33{,}000}$

should be

$$HP_r = \frac{\frac{1}{8} W_r + 2 \times S \times N}{33{,}000}$$

Installment 36.—June 3, 1944, page 63, Column 2:

Equation sign has been omitted from formula for drawdown. The formula should be:

$$FL_2 - FL_1 = \frac{P_1 - P_2}{K}$$

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Aromatics and Supergasoline

There is a lot of talk about aromatic gasolines. What are they and what do you make them out of?—R. C. T.

The term "aromatic" as applied to gasolines is purely a relative term. Gasolines, as we have known them, contain very small amounts of aromatic hydrocarbons, often as low as 2-4 per cent and any gasoline that contains 12 or more per cent of aromatics is sufficiently unusual to warrant some special name such as "aromatic gasoline." Much of the recent interest in aromatic gasolines arises from their value in making the high-octane gasoline required for military aircraft, and because we have been increasingly successful in producing aromatic gasolines by the various catalytic-cracking processes and other high-temperature chemical-conversion processes. The value of aromatic gasolines in actual engine performance has demanded the development of new methods of testing for octane number or detonation characteristics, notably the Army-Navy 1-C and 3-C methods of knock testing.

Analyses of gasolines given in the literature are not entirely consistent with respect to the amount of aromatics contained in them. Perhaps this is due in large part to the fact that adequate methods of analyzing for aromatic hydrocarbons have not been developed. Numerous methods are being used and the results obtained by the various methods do not check well with one another. Nevertheless, the approximate aromatic hydrocarbon content of various gasolines or fuels of the same boiling range is somewhat as follows:

	Per cent aromatics
Straightrun paraffin and mixed base and some naphthene base	1.5-10
Straightrun naphthene aromatic or so-called aromatic base	12.0-27*
Thermally cracked	10.0-30
Catalytically cracked, polyformed, hydroformed, etc.	9.0-35
Hydrogenated coal and the Forward process	40.0-90

*Gasoline from Borneo contains 36 per cent of aromatics but few, if any, other straightrun gasolines contain more than 27 per cent.

Part of the lack of consistency found in the literature stems from the fact that some analyses are given on raw or untreated stocks whereas others are given on treated stocks which are much richer in aromatics because of the removal of the unsaturated hydrocarbons which are unsuitable for gasoline. The high temperatures employed in many of the processes which produce large amounts of aromatics also tend to produce large amounts of olefins, diolefins, and unsaturated cyclo compounds. The aromatic hydrocarbon content of several straightrun gasolines was published in the November 4, 1943 (page 50) issue of this page. Analyses of various kinds of gasolines are also published in Aviation Gasoline Manufacturer by Van Winkle (McGraw-Hill Book Co., 1944), Petroleum Refinery Engineering, page 28 (McGraw-Hill, 1941, second edition), Chemical Technology of Petroleum, by Gruse & Stevens (McGraw-Hill, 1942) and The Chemistry of Petroleum Derivatives, Vol. 2, by Carleton Ellis (Reinhold Publishing Co.). Extremely high aromatic content is claimed for the Forward process (Kaplan & Forney, Ref. & Nat. Gaso. Mfr. 15, p. 260, 1936) and the hydrogenated coal fuels produced by the U. S. Bureau of Mines in their extensive program of study (W. L. Nelson, Hydrogenation of Coal, lists many references, The Oil and Gas Journal, May 8, 1941, p. 55) are highly aromatic. Although the tabulation does not show a greatly superior aromatic content for the catalytic-cracked gasolines, they are generally considered to be richer in aromatics than thermally cracked gasolines. Perhaps methods of analysis are partly to blame, as well as the unstable nature of thermally cracked materials which nearly excludes them from the manufacture of aviation gasoline.

The percentage of aromatics in the seven representative crude oils studied by Forziati, Willingham, Mair & Rossini, in connection with A.P.I. Research Project 6 (Refining Division of A.P.I., 24th annual meeting of A.P.I., November 10, 1943) are as follows:

PER CENT AROMATICS IN NAPHTHAS

	Up to 356° F.	Up to 320° F.
Winkler, Texas	4.9	1.81
Greendale-Kawkawlin, Mich.	7.2	5.03
Midway, California	8.0	4.76
Bradford, Pennsylvania	8.3	5.19
Ponca, Oklahoma	9.8	5.62
East Texas	10.4	6.32
Conroe, Texas	27.6	20.19

Aromatic Hydrocarbons

Although there are more than 30 hydrocarbons of the aromatic or benzene-ring type which boil at temperatures below 356° F., only about 15 of these have been found in petroleum except perhaps in extremely small amounts.

These data were taken from Physical Constants of the Principal Hydrocarbons, by Editor Doss, (The Texas Co.) and from A.P.I. Project 6. The blending octane numbers are very high, and performance in the engine as measured by the 1-C and 3-C methods of octane testing indicates in some instances even better detonation qualities. Hydrocarbon No. 7 in the list, also called cumene, has been of great value as a blending agent in producing 100-octane gasoline. The physical properties of cumene were given May 25, 1944, on this page.

PHYSICAL PROPERTIES OF THE MAIN AROMATIC HYDROCARBONS

No.	Formula	Name	B.P., °C.	Octane No. Research	Octane No. Research (blending)
1	C_6H_6	Benzene	80.1	100+	98.5
2	C_7H_8	Toluene	110.6	100+	123.5
3	C_8H_{10}	Ethyl benzene	136.2	*0.8	124.0
4	C_8H_{10}	p-Xylene	138.4	100+	120.0
5	C_8H_{10}	m-Xylene	139.2	100+	144.5
6	C_8H_{10}	o-Xylene	144.4	100+	145.5
7	C_9H_{12}	Isopropyl benzene	152.4	*2.08	132.0
8	C_9H_{12}	n-Propyl benzene	159.5	*1.52	127.0
9	C_9H_{12}	1-Methyl 3-ethyl benzene	161.6	...	130.0
10	C_9H_{12}	1-Methyl 4-ethyl benzene	162.5	...	147.0
11	C_9H_{12}	1,3,5-Trimethyl benzene	164.6	100+	161.0
12	C_9H_{12}	1-Methyl 2-ethyl benzene	165.1	...	107.0
13	C_9H_{12}	1,2,4-Trimethyl benzene	169.2	...	123.0
14	C_9H_{12}	1,2,3-Trimethyl benzene	176.1	...	....

*100-octane number to which is added cc. of lead.

Usefulness of Aromatics

The outstanding properties of the aromatic hydrocarbons from the petroleum industry standpoint are their good detonation qualities, their good solvency power, and their stability with respect to light and air. They are unsuitable for kerosene, certain special fuel oils, and for diesel fuel oil because of their tendency to burn with a smoky flame or have undesirable ignition qualities. The aromatics have proved of great usefulness to the organic chemical industries because of their ability

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Pumps fuel to fighting fronts!

to react chemically. The application of these hydrocarbons to the manufacture of synthetic rubber (styrene), explosives (toluene), dyes, perfumes, essential oils, plastics and medicines is discussed by A. W. Trusty (Refiner, April 1943, page 83).

Not many definite data regarding the superior power output of aromatic aviation fuels are available. Nevertheless, F. D. Klein (Trans. S.A.E. 39, 304, 1936) presents the following information:

Fuel—	O.N.	Approx. power output
92-octane grade, paraffinic	92	100
Benzene plus California naphtha plus 2.2 cc. TEL	92	161
Toluene plus natural gasoline plus isopentane plus 3 cc. TEL	97	194
Toluene plus benzene, plus isopentane plus 3 cc. TEL	99	243
100-octane grade, paraffinic	100	124

The superior solvency power of the aromatics as evident by such tests as aniline point, nitrocellulose dilution ratio, Kauri-butanol number, and lacquer dilution ratio, is well established. Aromatic naphthas command premium prices and this type of naphtha is the only kind of solvent that can be used for some services. A classification of solvent materials was published on this page in the issue of April 15, 1943.

The aromatic hydrocarbons do not tend to become discolored or to form gum-like materials when exposed to the air and light.

Manufacturing Processes

Little can be suggested for the manufacture of aromatic hydrocarbons from nonaromatic feed materials except exceedingly high temperature processes. Temperatures of 1,100° to 2,000° F. are required in order to obtain reasonable yields. The use of catalysts permits somewhat lower temperatures (around 1,000° F.) but such processes have not been widely used except in the manufacture of toluene from methylcyclohexane, heptane and other seven-carbon-atom materials in the same general boiling range. Detailed information is not available because of the war, but an idea of the operations may be gained from Industrial Engineering Chemistry 32, 528 (1940). According to these authors, Grosse, Morrell and Mattox, the yield of toluene from n-heptane can be as high as 90 per cent when employing recycling. Such processes are known as catalytic dehydrogenation processes.

Adequate metallic materials are not available for processes operating at 1,200° F. and up, and hence a full development of processes for the production of aromatics awaits the development of such alloys. In the past, low-pressure ceramic ware and brickwork equipments have been employed in most of the processes which produce large amounts of aromatics. Such processes may be illustrated by coal distillation, gas manufacturing operations, oil-shale distillation and oil-sand distillation. Such equipments or construction materials are not well adapted to proper control of the chemical process of producing aromatics and hence only small yields are obtained and the product is badly contaminated with unsuitable tar-like unsaturated materials.

Cecil D. Robinson, who was district geologist in the Rio Grande Valley for Arkansas Fuel Oil Co., has joined Coastal Refineries, Inc., as chief geologist, with headquarters in McAllen, Tex. Coastal Refineries is doing active exploratory work in the valley. **W. W. McDonald,** who has been geologist for Arkansas Fuel Oil Co. in San Antonio, will take care of the work formerly performed by Robinson.

John L. Essley, who resigned as vice president of Superior Oil Corp. last May, shortly before that company was merged with Sunray Oil Corp., has opened an office in Tulsa as an independent oil operator.

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Angles All Sizes
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Floor Plates and Stair Treads, for walkways, around tanks and refineries.
Stainless and Heat Resisting Steels, for refinery still tubes, valves, etc.
Stainless Steel Castings and pipe fittings for heat and acid resistance.
Alloy Steels, Tool Steels.
Concrete Reinforcing Bars and allied building materials.
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Write for Stock List

RYERSON STEEL-SERVICE

VISIBLE PRESSURE SEAL

...in this high-pressure

Shell-and-tube heat exchanger

The pressure-sealing member and head cover gasket of the G-R Type "L" Heat Exchanger are located OUTSIDE the cover.

Therefore, any seepage which might occur at this gasketed joint is immediately visible, and can be remedied easily without removing the water head cover.

This G-R Heat Exchanger has many additional important advantages . . . elimination of heavy bolts to maintain tightness of head-cover joints . . . ready removal of head cover . . . partition pass plates which prevent inter-pass leakage without requiring stay bolts . . . enveloping baffle which permits cross-over temperatures of cold and hot fluids. These and other features are described in bulletin which will be sent on request.

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Pioneers in Heat Transfer Apparatus

PRACTICAL REFINERY ENGINEERING

4—Heat Transfer Calculations

by Paul Buthod and B. W. Whiteley

MOST calculations involving the capacity of commercial heat-exchange equipment are based on an over-all coefficient of heat transfer. This coefficient takes into account all of the thermal resistances which tend to retard the flow of heat in an exchanger.

In the case of a tubular heat exchanger, heat flows through the mass of the hot fluid, is retarded as it encounters a stationary film adjacent to the metal wall, then flows with relative ease through the metal. The flow of heat is again retarded by a stagnant fluid film next to the metal wall on the cold side and finally passes into the core of the cold fluid. The thickness of these stagnant fluid films depends upon a number of complex factors.

The ability of a moving fluid to transmit heat is usually computed in terms of a film coefficient "h," which takes into account both the core of the fluid and the stagnant film at the metal wall. The thermal resistance "R" is the reciprocal of the film coefficient. In the fundamental rate equation,

$$(1) \qquad q = \frac{A\,\Delta t}{R_1 + R_2 + R_3 \ldots}$$

the thermal resistances are computed separately for each fluid, metal wall and any scale encrustations.

By the principles of dimensional analysis, it can be shown that for forced convection:

$$\frac{hD}{k} = \phi\left(\frac{D\,u\,\rho}{\mu}\right)\phi'\left(\frac{c\,\mu}{k}\right)$$

The first term on the left-hand side of the equation is often called the Nusselt number and the two expressions enclosed by brackets on the right-hand side are known as the Reynolds number and Prandtl number, respectively. The major portion of the experimental data given in the literature is presented in graphical form by plots of these three dimensionless groups.

For computation of film coefficients for petroleum liquids in forced convection inside pipes, the Morris and Whitman data are used. The mathematical expression for these data is:

$$\frac{hD}{12\,k} \div \left(\frac{2.42\,c\,\mu}{k}\right)^{0.4} = y$$

where "y" is a function of the Reynolds number to be determined from a graphical plot of the Morris and Whitman data. All of the thermal properties of the oil are to be evaluated at the average fluid temperature.

To avoid the computation of the film coefficients for petroleum liquids, the accompanying charts (see next page) may be used. Instead of the film coefficient, the charts give the thermal resistance ($R = 1/h$) which may be used directly in Equation 1. The use of the charts is illustrated by the following example:

Example.—A 30° A.P.I. heavy gas oil is carried through a 2.25-in. i.d. tube and is being cooled by water on the outside of the tube. The mass velocity is found to be 770,000 lb./hr.-sq. ft. and the average viscosity is 20 centipoises. Calculate the thermal resistance "R," and the film coefficient "h."

Solution.—To determine the Reynolds number, enter the chart as a mass velocity of 770,000 at the bottom. Note that the scale for mass velocity is a reciprocal scale, i.e., the numbers increase from right to left. Rise vertically to a point between the diagonal lines marked 2.0 and 2.5, "Pipe Size I.D." From this point, move to the right to another diagonal line in the opposite direction which is the 20-centipoise "viscosity" line. From this point move vertically to the top scale which gives Re = 3,000. This procedure is indicated by a dotted line with arrows marking the direction.

For the determination of thermal resistance use the chart for "Heat-Transfer Film Coefficient." Enter the chart at the bottom where Re = 3,000 and rise to the curved line marked "Oil Being Cooled." Move horizontally to the left to the diagonal line 20 centipoises. Move vertically upward to the opposite sloping lines marked "Pipe I.D.—Inches," to the point where the inside diameter is 2.25.

From this point move to the left until reaching a point intermediate between the vertical lines marked "A.P.I. Gravity" 20° and 40° and interpolate to obtain the 30° point. At this point move upward to the left and parallel to the diagonal guide lines and read R = 0.036 on the left scale.

The value of the film coefficient is the reciprocal of the resistance or:

$$h = \frac{1}{R} = \frac{1}{0.036} = 27.8 \text{ B.t.u./hr.-sq ft.-°F.}$$

The chart may be used in a similar manner to obtain the thermal resistance and film coefficient for other instances involving forced convection of petroleum liquids inside pipes. By using a "shape factor" in place of the "actual pipe inside diameter," the chart is readily adapted to the flow of oil through other than circular shapes. For the flow of oil through an annular ring, as in double-pipe heat exchangers, this shape factor is four times the cross-sectional area of the channel divided by the outside diameter of the inner pipe or expressed mathematically:

$$D' = \frac{D_1^2 - D_2^2}{D_2}$$

Where D′ is the equivalent diameter to be used in place of the actual pipe inside diameter on the chart, D_1 is the inside diameter of the outer pipe, and D_2 is the outside diameter of the inner pipe.

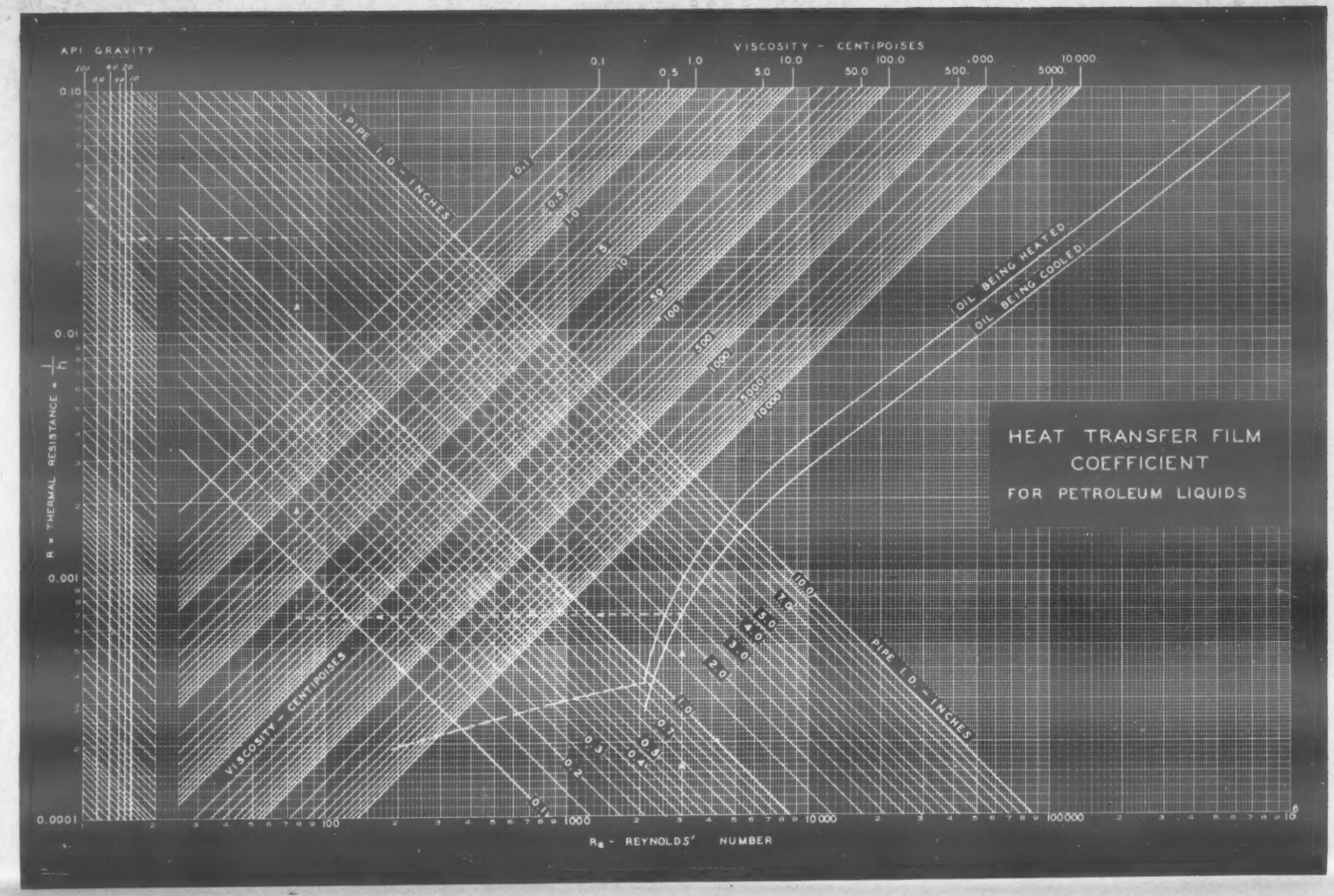
Notation:

- R_1, R_2, R_3, etc. = thermal resistances, 1/h
- h_1, h_2, h_3, etc. = film coefficients, B.t.u./hr.-sq. ft.-°F.
- D = actual inside diameter of pipe or tube, inches
- k = thermal conductivity, B.t.u./hr.-sq. ft.-°F.
- c = specific heat, B.t.u./lb.-°F.
- μ = viscosity, centipoises
- u = velocity, ft./sec.
- ρ = density, lb./cu. ft.
- Re = Reynolds number
- V = mass velocity, lb./hr.-sq. ft.-°F.

Bibliography and References

1. McAdams, W. H., "Heat Transmission," McGraw-Hill Book Co., New York, 1933.

2. Morris and Whitman, Ind. Eng. Chem. 20, 234 (1928).


API GRAVITY
VISCOSITY - CENTIPOISES
0.1
0.5
1.0
5.0
10.0
50.0
100.0
500.
1000.
5000.
10000.
R = THERMAL RESISTANCE = 1/h
PIPE I.D. - INCHES
OIL BEING HEATED
OIL BEING COOLED
HEAT TRANSFER FILM COEFFICIENT
FOR PETROLEUM LIQUIDS
VISCOSITY - CENTIPOISES
PIPE I.D. - INCHES
R_e - REYNOLDS' NUMBER

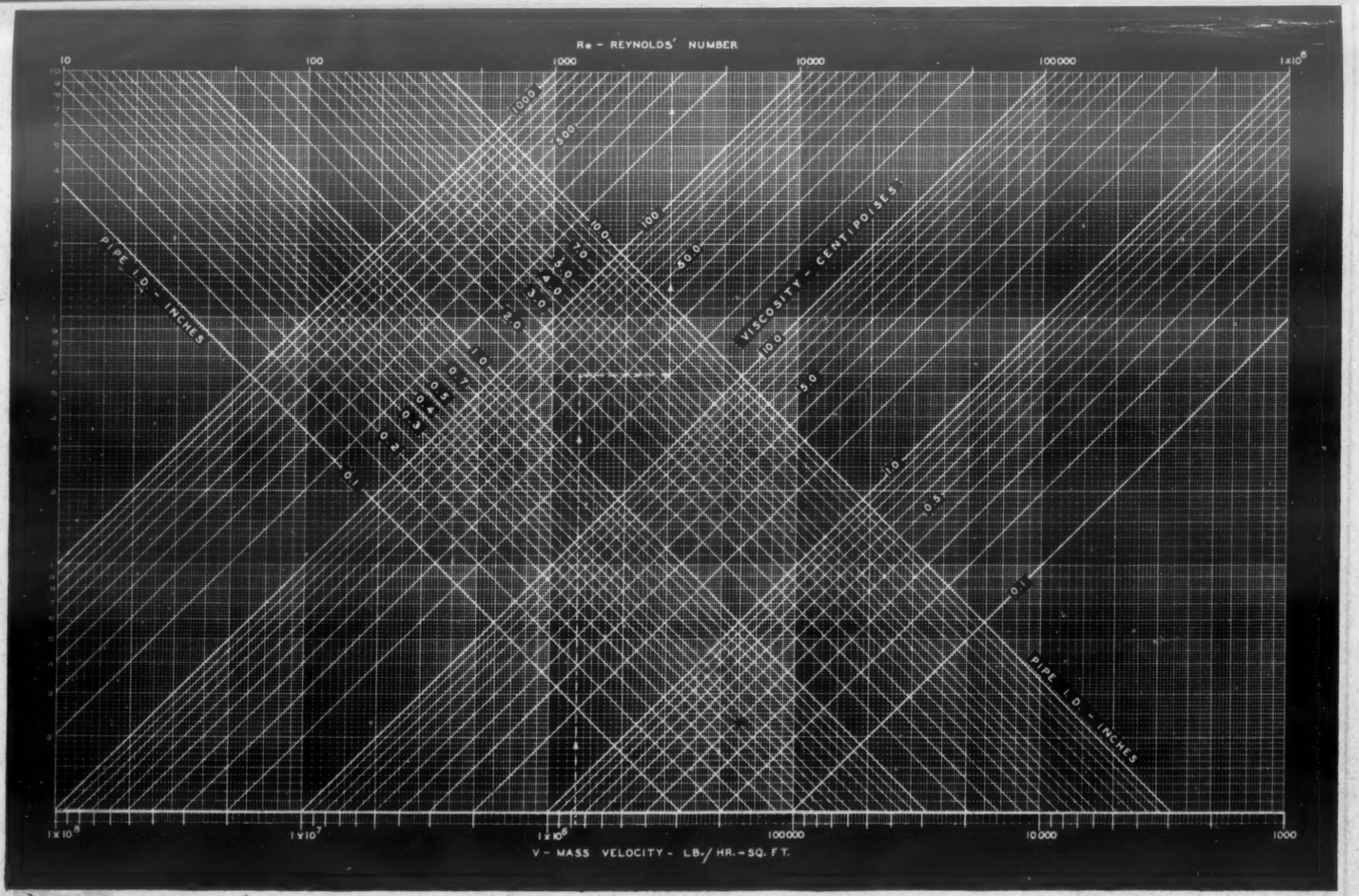


Chart for determining Reynolds number *(see page 105)*

59 Years background of Industrial Installations geared to Nation-wide, Large-scale Operations including Turnkey Handling of Gas Processing Plants since early days of the Natural Gas Industry 1885-1944

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BURSTING STRENGTH OF CASING

SINCE the advent of squeeze-cementing practices and the discovery of abnormally high formation pressures in recent years, bursting strength has become an important consideration in the design of oil-well casing strings.

Casing is considered to have failed when the stress in the steel exceeds its yield strength. At the yield point the steel becomes permanently deformed, but will not rupture or part until the stress exceeds the ultimate tensile strength of the pipe. Since permanent deformation of the pipe is undesirable, bursting strength is based upon yield strength rather than upon ultimate tensile strength.*

Barlow's formula for computing the resistance of a tube to internal pressure is:

$$P = 2St / D$$

Where

S = yield strength of material, lb. per sq. in.
P = internal pressure, lb. per sq. in.
t = thickness of wall, inches
D = outside diameter, inches

This formula is used as a basis for calculating the minimum resistance of A.P.I. casing to bursting by internal pressure. In this calculation, however, allowance is made for the fact that there is a permissible variation of 12½ per cent in the wall thickness of the pipe. That is, using nominal values for wall thickness, the minimum values for yield strength, and Barlow's formula, the result obtained should be multiplied by 0.875 in order to allow for the fact that the actual wall thickness could permissibly be only 87.5 per cent of the nominal wall thickness. On this basis, Barlow's formula becomes:

$$P = \frac{0.875 \times 2 \times S \times t}{D} = \frac{1.75\,St}{D}$$

Where

P = internal yield pressure, lb. per sq. in.
S = minimum yield strength, lb. per sq. in.
t = nominal thickness of wall, in.
D = outside diameter, inches

This is the method used by the A.P.I. in calculating internal yield pressures for various sizes and grades of A.P.I. casing, and such values are given in Table 1. The figures given in Table 1 do not include any factor of safety. Users, in applying the data, should select such factors of safety as best suit the conditions. A rather common practice is to apply a safety factor of 1.2 when using values based on yield strength of the pipe, which is about equivalent to using a safety factor of 2.0 based on the ultimate tensile strength.

References

1. A.P.I. Code 5-C-2, 2nd ed., May 1942, "Setting Depth Properties of Casing."
2. Hills, J. O., "Design of Casing Programs," A.P.I. Drilling and Production Practice, 1939, pp. 369-382.

*Values for yield strength and tensile strength of various grades of A.P.I. casing were given in Table 2 of Installment 139.

†See Table 2, Installment 139.

TABLE 1—MINIMUM RESISTANCE OF VARIOUS SIZES AND GRADES OF API CASING TO DAMAGE BY INTERNAL PRESSURE*

O.D. (in.)	Weight (lb./ft.)	Nom. wall thickness (in.)	Internal yield pressure, lb./sq. in. F-25	H-40	J-55	N-80
4½	9.50	0.205	1,990	3,190	4,380	....
4½	11.60	0.250	....	....	5,350	7,780
4½	13.50	0.290	....	....	....	9,020
5	11.50	0.220	1,930	....	4,240	....
5	13.00	0.253	....	....	4,870	....
5	15.00	0.296	....	....	5,700	8,290
5	18.00	0.362	....	....	....	10,140
5½	13.00	0.228	1,810	....	....	....
5½	14.00	0.244	....	3,110	4,270	....
5½	15.50	0.275	....	....	4,816	....
5½	17.00	0.304	....	....	5,320	7,740
5½	20.00	0.361	....	....	....	9,190
5½	23.00	0.415	....	....	....	10,560
6	15.00	0.238	1,740	....	....	....
6	18.00	0.288	....	3,360	4,620	6,720
6	20.00	0.324	....	....	....	7,560
6	23.00	0.380	....	....	....	8,870
6⅝	17.00	0.245	1,620	....	....	....
6⅝	20.00	0.288	....	3,040	4,180	....
6⅝	24.00	0.352	....	....	5,110	7,440
6⅝	28.00	0.417	....	....	....	8,810
6⅝	32.00	0.475	....	....	....	10,040
7	17.00	0.231	1,440	2,310	....	....
7	20.00	0.272	....	2,720	3,740	....
7	23.00	0.317	....	....	4,360	6,340
7	26.00	0.362	....	....	....	7,240
7	29.00	0.408	....	....	....	8,160
7	32.00	0.453	....	....	....	9,060
7	35.00	0.498	....	....	....	9,960
7	38.00	0.540	....	....	....	10,800
7⅝	20.00	0.250	1,430	....	....	....
7⅝	24.00	0.300	....	2,750	....	....
7⅝	26.40	0.328	....	....	4,140	6,020
7⅝	29.70	0.375	....	....	....	6,890
7⅝	33.70	0.430	....	....	....	7,890
7⅝	39.00	0.500	....	....	....	9,180
8⅝	24.00	0.264	1,340	....	....	....
8⅝	28.00	0.304	....	2,470	....	....
8⅝	32.00	0.352	....	2,860	3,930	....
8⅝	36.00	0.400	....	....	4,460	6,490
8⅝	40.00	0.450	....	....	....	7,300
8⅝	44.00	0.500	....	....	....	8,120
8⅝	49.00	0.557	....	....	....	9,040
9⅝	29.30	0.281	1,280	....	....	....
9⅝	32.30	0.312	....	2,270	....	....
9⅝	36.00	0.352	....	2,560	3,520	....
9⅝	40.00	0.395	....	....	3,950	5,750
9⅝	43.50	0.435	....	....	....	6,330
9⅝	47.00	0.472	....	....	....	6,870
9⅝	53.50	0.545	....	....	....	7,930
10¾	32.75	0.279	1,140	1,820	....	....
10¾	40.50	0.350	....	2,280	3,130	....
10¾	45.50	0.400	....	....	3,580	....
10¾	51.00	0.450	....	....	4,030	5,860
10¾	55.50	0.495	....	....	....	6,450
11¾	38.00	0.300	1,120	....	....	....
11¾	42.00	0.333	....	1,980	....	....
11¾	47.00	0.375	....	....	3,070	....
11¾	54.00	0.435	....	....	3,560	....
11¾	60.00	0.489	....	....	4,010	5,830
13⅜	48.00	0.330	1,080	1,730	....	....
13⅜	54.50	0.380	....	....	2,730	....
13⅜	61.00	0.430	....	....	3,090	....
13⅜	68.00	0.480	....	....	3,450	....
13⅜	72.00	0.514	....	....	....	5,380
16	55.00	0.3125	850	....	....	....
16	65.00	0.375	....	1,640	....	....
16	75.00	0.4375	....	....	2,630	....
16	84.00	0.495	....	....	2,960	....
20	90.00	0.417	910	1,460	....	....

*From A.P.I. Code 5-C-2, 2nd ed., May 1942, "Setting Depth Properties of Casing."

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

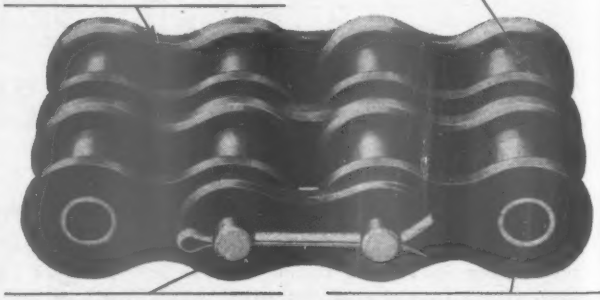
WHERE SPEED IS THE NEED...

① THEY TRAVEL IN FAST COMPANY, these Rex Roller chain belts. For where the emphasis is on speed, as in servicing rigs, motor power rigs, and pumping rigs, you'll find Rex Roller chains doing the job positively and smoothly. They're a top favorite with experienced oil men in all fields.

② FOR EXAMPLE, cast your eye on this service rig. Note the sturdy Rex Roller chain driving the drum hoist. Pulling sucker rods out of the hole—lowering and lifting the baler—place a heavy strain on equipment—a strain that Rex Roller chain belts can take in their stride. They're built for tough, speedy service . . . to absorb damaging shocks and strains.

Steel side plates, heat-treated for strength and toughness, blanked, pierced and broached to insure uniformity of pitch and press fits on pins and bushings.

Alloy steel roller heat-treated for extreme toughness and resistance to wear, then ground to size.



Alloy steel pin, case hardened, ground for accuracy, superior bearing surface. Shorter pitch chains furnished with riveted construction.

Alloy, case hardened steel bushing ground for accuracy and press fits in side bars.

③ HERE'S WHY THEY'RE SO POPULAR. Rex Roller chain is a product of the highest quality workmanship and engineering experience—made of the best quality materials. Note how accurately the link is formed. Here's the chain that offers the best in positive power transmission—in shock absorbing ability.

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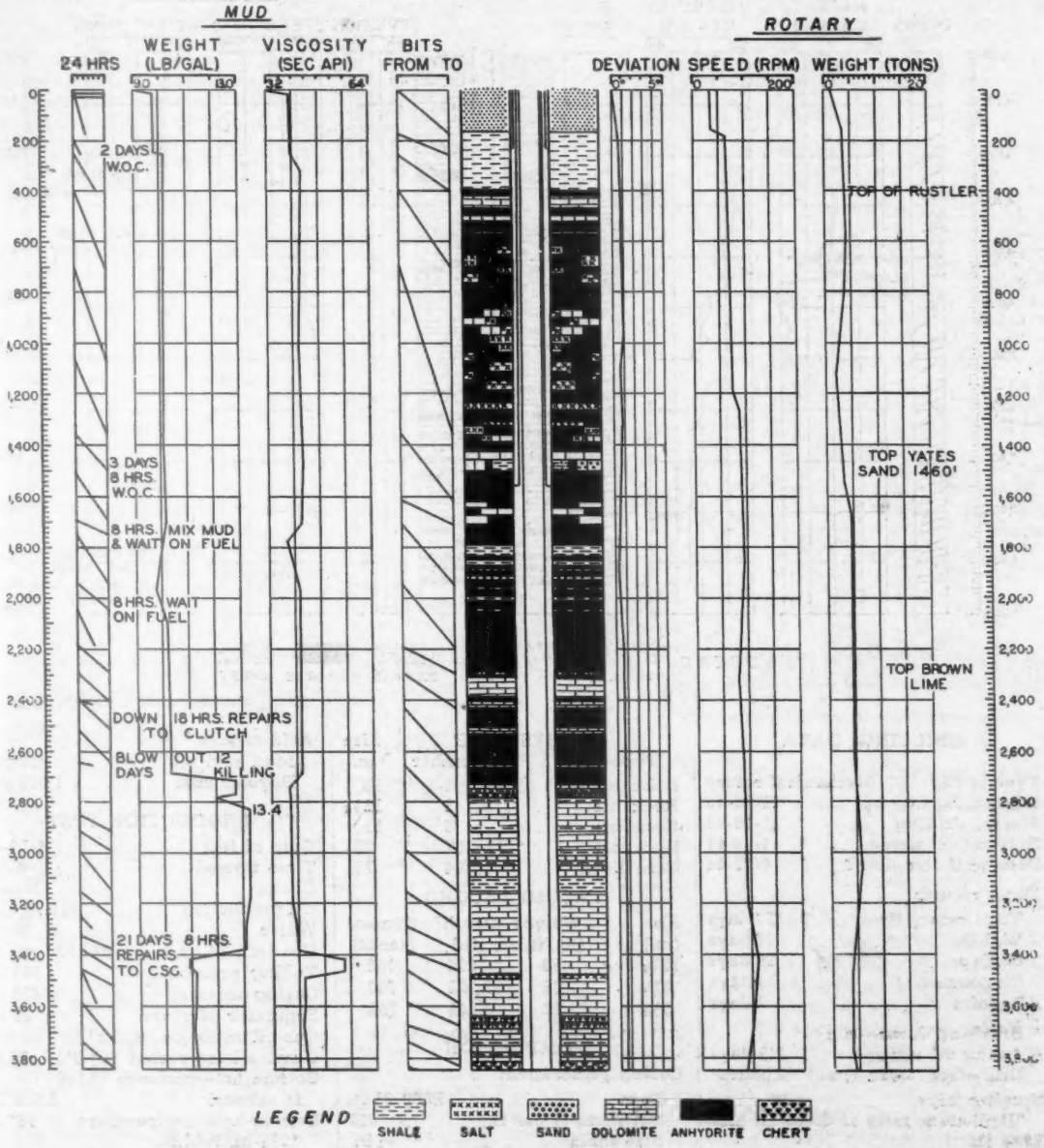
Journalog

No. 62

Discovery Well, Sand Hills Ellenburger Field, Crane County, Texas

GULF OIL CORP. 43-E W. N. WADDELL ET AL
2,010 ft. from SL and 1,980 ft. from EL, Sec. 20, School Block B-26. Elevation ground level 2,655 ft. Derrick floor, 2,665 ft.

CONTRACTOR
Gardner Brothers



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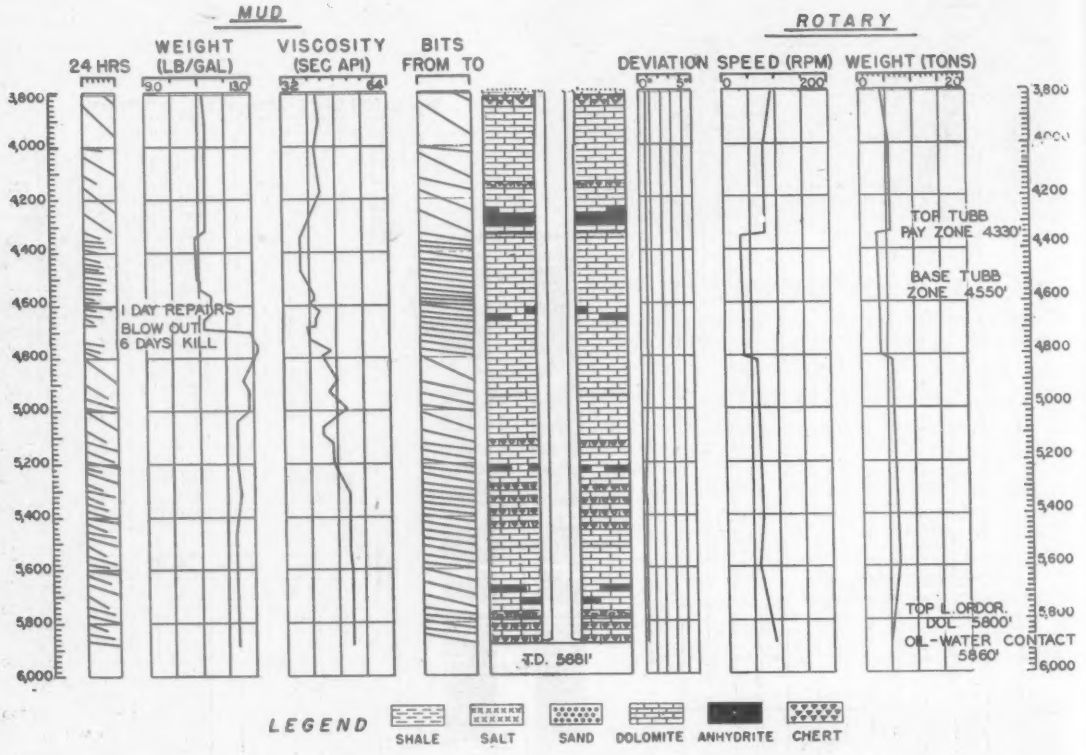
Journalog

Discovery Well, Sand Hills Ellenburger Field, Crane County, Texas (continued)



DRILLING DATA

Type of Rig	Mechanical rotary
Started rigging up	11-16-43
Started drilling	11-18-43
Date set oil string	4- 3-44
Date well completed	4-19-44
Time record:	
Total rotary time	157 days
W.O.C.	18 days
Coring	29 days
Circulating	16 days
Repairs	7 days
Breaking down—running oil string	1½ days
Drill-stem tests (two)*	2 hours
Number trips	80

*Drill-stem tests at 5,840 ft. and 5,881 ft.

BITS USED

Type	Number	Size in.
Rock bit	1	15
Rock bit	1	12¼
Rock bit	5	11
Rock bit	57	7⅞
Core head	34	7⅞

CASING RECORD

Size (in.)	Weight (lb./ft.)	Depth (ft.)	Cement (sacks)
13⅜	50	226	160
8⅝	28	3,391	700
5½	17	5,881	750

COMPLETION

Casing perforation:	
Depth	5,800-35 ft.
No. shots (6 per ft.)	210
Size shots	½ in.
Acidization:	
Mud acid	250 gal.
Regular acid	1,000 gal.

PRODUCTION TEST

Date of test	4-19-44
Time flowed	6 hr.
Choke	None*
Oil production	318.75 bbl.
Water	None
Gas (est. 24 hr.)	561,036 cu. ft.
Tubing pressure	580 lb.
Casing pressure	475 lb.
Separator pressure	20 lb.
Gas-oil ratio (cu. ft./bbl.)	440
Grav. oil (corrected 60° F.)	35.6°
Bottom-hole pressure (3,100 ft. subsea)	2,580 lb.
Bottom-hole temperature	96° F.

*2½-in. tubing.

Natural Gas

New Orleans Consumers to Get Refund of $700,000

WASHINGTON.—Refund of approximately $700,000 and annual savings totaling about $674,853 are in prospect for New Orleans consumers of natural gas as a result of approval by Federal Power Commission of new wholesale rates to be put into effect by Interstate Natural Gas Co., Inc., and United Gas Pipe Line Co. The new schedule is retroactive to June 15, 1943.

The commissioner of public utilities of New Orleans has advised the commission that "New Orleans Public Service, Inc., has agreed to pass on and I will see that it passes on to its customers the same amount received by it as a result of the reduction in the city-gate rates." The commission has received similar assurance from Louisiana Power & Light Co.

The rate reductions grew out of a complaint filed by Louisiana Public Service Commission against Interstate and enlarged by the commission's order for an investigation of wholesale rates and transportation rates of Interstate. These proceedings were consolidated and the cities of New Orleans and Baton Rouge were permitted to intervene.

Texas July Gas Allowables Fixed by Commission

AUSTIN.—Orders fixing the daily allowable production of natural gas for July have been issued by Railroad Commission of Texas as follows: Rodessa field, 36,210,065 cu. ft.; Carthage field, 15,389,548 cu. ft.; Agua Dulce field, Dabney sand, 25,000,000 cu. ft.; sour-gas area of West Panhandle field, 673,362,000 cu. ft.

New Rate Schedules Are Filed by Hope Natural

WASHINGTON.—New schedules filed by Hope Natural Gas Co., Clarksburg, W. Va., and approved by Federal Power Commission, reduce interstate wholesale rates for gas sold to Ohio and Pennsylvania distributors by $5,188,703 annually.

The new rates are based on a May 1942 order by the commission upheld by the supreme court last January. FPC said the reduction would apply on bills based on meter reading made on and after July 15, 1942.

Applied to Hope's 1943 operations the new rates reflect annual reductions of $3,601,148 for East Ohio Gas Co.; $1,501,051 for Peoples Natural Gas Co.; $59,659 for Manufacturers Light & Heat Co., and $26,845 for Fayette County Gas Co.

Commission to Study Rates Of Columbia Subsidiaries

WASHINGTON.—Federal Power Commission will hold a hearing here September 5 to determine (1) the status of United Fuel Gas Co., Warfield Natural Gas Co., Cincinnati Gas Transportation Co., and Huntington Development & Gas Co. under the Natural Gas Act, and (2) the reasonableness of the rates charged by these companies. All four are subsidiaries of Columbia Gas & Electric Corp., with principal offices in Charleston, W. Va.

The hearing to fix the proper rate base and fair rate of return is of importance to consumers in District of Columbia, Kentucky, Maryland, New York, Ohio, Pennsylvania, Virginia and West Virginia as it may result in reductions in retail gas rates.

Chicago Corp. Acquiring Interest in Gas Leases

CORPUS CHRISTI.—An undivided one-half interest in leases covering approximately 6,400 acres in the Menefee gas field area, Wharton County, has been acquired by Chicago Corp. from Salt Dome Oil Corp. and Pan American Production Co., subject to approval of Reconstruction Finance Corp.

On completion of the transaction, Menefee leases will be owned 50 per cent by Chicago Corp., 33 11/100 per cent by Salt Dome, and 16 89/100 per cent by Pan American. Salt Dome will be the initial operator of the properties. Chicago Corp. and Pan American have also purchased at cost a like interest in two completed gas wells owned by Salt Dome.

As a further step in the transaction, if consummated, Chicago Corp., Pan American and Salt Dome have contracted with Tennessee Gas & Transmission Co., present builders and future operators of a gas line from Texas to West Virginia, for sale of gas from the Menefee area, with a minimum obligation by the Tennessee company to purchase 10,000,000 cu. ft. daily. The price is to be paid by Tennessee is 5 cents for 1,000 cu. ft. the first 5 years, 6 cents the second 5 years, 7 cents the third 5 years, and 7½ cents the last 5 years of the 20-year term of agreement. It is expected deliveries of gas under this agreement will begin about January 1, 1945.

Control Tightened on Furnace-Type Blacks

WASHINGTON.—The War Production Board has revoked Order M-244, transferred allocation control of furnace type carbon black to Order M-300, and extended allocation controls to include the rubber grades of channel type carbon black.

To assure an adequate supply of furnace type carbon black for the rubber industry, allocation controls are made somewhat tighter under provisions of the order. WPB's action brings rubber grades of channel type carbon black under allocation for the first time.

In the interests of simplified paper work, customers may now order up to 20,000 lb. of furnace type carbon black or rubber grades of channel type carbon black by filing an end-use certificate with the supplier.

Natural Gasoline

Reclaimed Material Used in New East Texas Plant

MARSHALL, Tex.—The new gasoline plant which Arkansas Louisiana Gas Co., subsidiary of Cities Service Oil Co., put into operation last week in Panola County, 10 miles northeast of Carthage, was built almost entirely of reclaimed material, reconditioned to give good service. The plant, of the absorption type, is the thirteenth for Arkansas Louisiana and fifth in the East Texas area. It has a capacity of 25,000,000 cu. ft. of gas daily.

Manpower shortage necessitated use of inexperienced local labor on most of the construction work and material shortages dictated utilization of salvage materials that went into the plant.

REFINING

Oil Transport Charges in Colorado Are Revised

WASHINGTON.—Either the maximum prices prescribed by Office of Price Administration or the minimum prices fixed by the state may be charged by private motor carriers for transportation of oil and oil products in bulk in tank trucks between points inside the state of Colorado, OPA announced last week. This right of choice was granted after a study showed that Colorado minimum rates are just and reasonable and not inconsistent with the criteria used by OPA in the stabilization of rates in this field, OPA said.

The action will remove any conflict existing where OPA ceilings are lower than the rates issued by Public Utilities Commission of Colorado. The commission has given assurance of cooperation in connection with any future applications for rate increases and has assured the agency that OPA standards will be carefully considered in the promulgation of any new rates.

No increase in prices of petroleum or petroleum products in Colorado is expected to result, OPA said.

Private motor carriers are the same as those known as contract motor carriers in other states. In Colorado they are officially designated as private motor carriers. They are generally owners of tank trucks and are employed by oil companies and others to transport oil or oil products.

The action is taken in amendment No. 150 to revised supplementary regulation No. 14.

Eight Perish in Accident at Aviation-Gasoline Plant

OIL CITY, Pa.—Eight persons are dead and several others are in hospitals as a result of a series of explosions and fire July 6 in a unit of Defense Plant Corp.'s aviation-gasoline plant near here. The first explosion occurred while a valve was being repaired in the gas-concentration system.

The plant, constructed at an estimated cost of $5,000,000, had been in operation less than 2 months.

Officials of the four companies jointly operating the plant—Pennzoil Co., Continental Refining Co., Quaker State Oil Refining Corp., and Wolf's Head Oil Refining Co.—said they were unable to determine the exact cause of the explosions. Meanwhile, they met with government officials to decide what action should be taken on reconstruction.

Method of Fixing Prices of Products Likely to Stand

WASHINGTON.—Refiners of the Middle West have been holding conferences with officials of Office of Price Administration concerning the regulation which forbids fixing of prices of oil products on an Oklahoma (Group 3) basis unless the products originate in that state, but there is said to be no likelihood of this rule being rescinded.

The point of the last sale should afford the basis for the price, from the standpoint of OPA, which contends that any system which would make a price at one point applicable at another point is impractical. However, OPA is not opposed to a basing point system, as refiners meeting with price officials have been told, but such a system must be in accord with the approximate price the industry received in the base period.

Eventual amendment of the delivered-at-destination ceiling price policy in the Middle West is receiving consideration, since that region had a basing point system in effect before and during the base period. Marketing committees of the Petroleum Administration for War are also studying the problem.

OPA officials are reported to be hopeful of setting up an f.o.b. refinery price scale for Kansas under price regulation No. 88. This would specify prices rather than the formula pricing system now used, such as has been set for northern and western Texas and Shreveport.

A matter under discussion in the fuel price division concerns a recent protest of 12 Michigan refiners in the Travis sand producing area against any increase in crude-oil prices. OPA already had increased one field, and had proposed to bring other fields up to that level. The refiners, fearing a spiral, have said they cannot absorb the proposed increases, and even request that the increase given Fork field be re-

Sketches of Plant Operators

F. C. CUTTING, now superintendent of the Wood River plant of Shell Oil Co., Inc., has at least three enthusiasms — photography, fishing, and complex problems of oil refining. He can talk with the authority of experience on each subject.

Graduating from University of Michigan in 1924 with an M.S. degree in chemical engineering, Cutting spent an eventful year with a wood products concern in northern Montana. In 1925 he joined the natural-gasoline division of the old Roxana (Shell) Petroleum Corp., devoting his time principally to design and operation of stabilizers and the chemical phases of gasoline-recovery operations. Since then he has been engaged in various branches of technical work at Shell Refineries at Norco, Houston, East Chicago, and Wood River, as well as in the company's head office in New York and with Shell Development Co.

F. C. CUTTING

Since December 1939, Cutting has held executive positions at Wood River, and at the time of his recent advancement was assistant superintendent, supervising gasoline recovery, light hydrocarbon fractionation and treating, and the manufacture of alkylate, cumene, hydrocodimer and toluene. In his new post he exercises general supervision of the entire refinery. He is married and has three children.

voked. OPA's proposal would increase crude prices in the eight Travis sand fields from $1.39 to $1.44 a barrel.

Order on Crude Allocation Goes to District 2 Plants

CHICAGO.—W. W. Vandeveer, director in charge of District 2, Petroleum Administration for War, has sent to 17 refiners in the district an order requesting them to supply specified quantities of crude to certain refineries in the district during July. This action is in continuation of the plan looking to equitable distribution of crude supplies. A total of 24,275 bbl. will be shared daily under the plan, compared with 27,350 bbl. in June, when 16 suppliers were involved.

Crown-Employes to Vote on Bargaining Representative

WASHINGTON. — In accordance with an order issued by National Labor Relations Board an election will be held within 30 days at the refinery of Crown Central Petroleum Corp. in Pasadena, Tex., to decide upon the collective-bargaining representative of the 265 employes. The board ruled that all production and maintenance employes shall be eligible to vote for Oil Workers' International Union (CIO); Houston Labor and Trades Council (AFL); International Brotherhood of Firemen and Oilers (AFL) or for no union.

WPB Releases Rules on Aromatic Solvents

WASHINGTON. — The War Production Board has amended Order M-150, increasing the list of permitted uses of aromatic petroleum solvents specified in the order, WPB reported last week.

The definition of Class A solvents was clarified in the amended order by the addition of an initial boiling point of 125° and of a dry point not in excess of 365° F. in the definition contained in the order. Neither point was clearly defined prior to the amendment.

Careful consideration was given the list of prohibited end uses contained in Schedule A of the order, WPB said, and certain small uses requiring only limited amounts of the aromatic solvents were removed from the schedule, reducing it from the 92 items prohibited before amendment to the 38 forbidden end uses comprising the revised list.

Striking Oil Workers Fail To Get Union's Support

GALVESTON.—Following refusal of the War Labor Board's chairman to take any action until production is again normal, members of the United Oil Workers Local 449 returned to work at Republic Oil Refining Co.'s plant in Texas City last week. The men had failed to report for work when a question of seniority rights arose.

Officials of War Labor Board, War Production Board and the international vice president of the CIO upheld the contention of the company that the union had not followed its contract, and recommended that the men return to work until an agreement is reached.

ODT Emphasizes Rules Applying to Tank Cars

WASHINGTON.—Due to sharply increased military demands for petroleum and petroleum products, particularly fighting grade aviation gasoline, Director J. Monroe Johnson of the Office of Defense Transportation this week emphasized that tank car loadings of these vital war supplies must be given preference over all other tank-car shipments.

"I appreciate the difficulties you experience through loss of manpower," Colonel Johnson wrote the rail executives. "However, a little extra effort on the part of the men you have been able to retain may result in the saving of many tank-car days through a reduction in the turnaround time, which saving itself will contribute materially to the movement of petroleum for military purposes."

In his letter to presidents of oil companies, Colonel Johnson pointed out that tank cars in eastern petroleum service had fallen from 63,452 on May 15 to 60,143 on June 16 this year. "Observance of the 7-day loading and shipping program will mean the equivalent of several thousand cars being added to our tank car fleet," he wrote.

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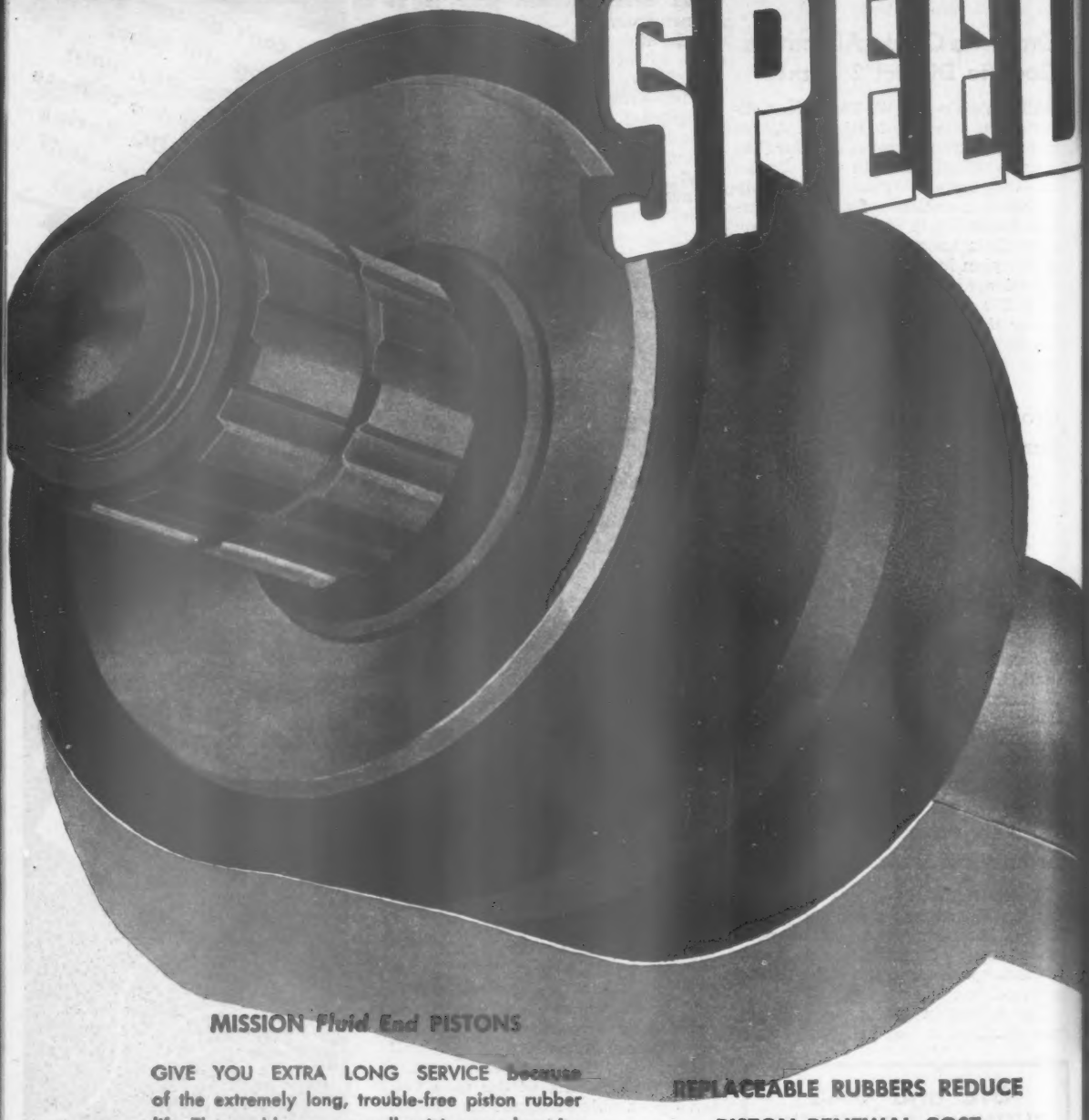

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MISSION PISTON RODS

. . . have been the choice of leading operators all over the world for years. The excellent wearing qualities of the file-hard surface is due to Mission's special combination of heat treatment and rod material. These rods combine a core tensile strength of over 120,000 pounds per sq. in. with exceptionally high ductility. This combination of strength and toughness gives maximum protection against rod breakage.

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The self-sealing principle **automatically** allows pump pressure to adjust packing to the correct tightness, giving perfect sealing while reducing packing and rod wear.

MISSION *Slush Pump* VALVES:

Replaceable Bushings take the wear instead of the larger, more expensive valve seat—increasing valve seat life many times. **New, Compound-308 Inserts** last from three to five times as long as regular inserts in ordinary mud, and up to ten times longer than ordinary oil-resisting inserts in hot mud, treated mud, or oil and gas.

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PIPE LINES

Stanolind Prepares for Drumright-Sycamore Loop

For the looping of 41 miles of 16-in. of the present trunk crude-oil system, Stanolind Pipe Line Co. is reported to be preparing to complete letting of contracts this week. Looping is to be done between Drumright, Okla., and Sycamore, Kans., so as to raise capacity from 124,000 bbl. to 134,000 bbl. daily. This undertaking is said to be necessary for maintaining balance in the Stanolind system because oil available from western Kansas and Wyoming has been estimated to be 8,000 to 10,000 bbl. daily less than previously anticipated due to developments in oil production programs.

WEP Handles Large Crude And Products Shipments

Through the 24-in. line of War Emergency Pipelines, Inc., deliveries of crude oil from Longview, Tex., to Norris City, Ill., averaged 321,000 bbl. daily between June 17 and June 23. Oil delivered to the Ohio Oil Co. system at Enfield, Ill., averaged 7,000 bbl. daily. Movements of crude from Norris City to the East Coast averaged 304,000 bbl. daily. Crude was moved for feeding the WEP system through the Southwest Emergency line of Defense Plant Corp. at a daily rate of 76,000 bbl. for a week in the latter part of June.

Deliveries of products through the WEP 20-in. products line have been between 176,000 and 178,000 bbl. daily in the same period. These movements have contributed substantially to a high average record of more than 280,000 bbl. daily of all products pipe-line deliveries to the East Coast area.

Shell to Recondition Lines From Tonkawa to Cushing

Shell Pipe Line Corp. is planning to recondition two parallel 52-mile 6-in. crude-oil lines totaling 104 miles between Tonkawa and Cushing, Okla. In connection with this project there will be relocating and shortening of lines between Udall and Rainbow Junction which will involve taking up 17 miles of 6-in. line of which 11 miles will be relaid on a shorter route while the remainder of approximately 6 miles will be available for use in the reconditioning operations. It is reported that a contract may be let soon.

Phillips Lets Contracts to J. R. Stewart Cons. Co.

Phillips Petroleum Co. has awarded a contract to J. R. Stewart Construction Co. for building 200 miles of 2-in. to 24-in. crude-oil gathering system in the Fullerton area of West Texas. This construction firm also has been awarded a contract for a 15-mile 8-in. line by Standish Pipe Line Co., subsidiary of Phillips Petroleum Co., from its gathering system and tanks in the Goldsmith pool of Ector County, Texas. The purpose of the line is to provide an outlet for the multipay Embar pool of southern Andrews County, Texas.

Oklahoma Pipe Line Co. to Connect With Yale System

Oklahoma Pipe Line Co. has a project for laying 7 miles of 8-in. crude-oil line from the Frannie pool, Wyoming, to Warren station on Yale Oil Pipe Line Co.'s 83-mile system from Elk Basin, Wyoming, to Billings, and Laurel, Mont., now under construction. Progress is reported to have been made in laying the line and installing equipment at three pump stations in the program for completing the Yale system this month.

Gathering Systems Enlarged in Texas

Sinclair Refining Co.'s pipe line division has put into use a new 3-mile 3-in. line from its Eliasville system of southern Young County, North Texas, to Northern Ordnance, Inc., Bend lime discovery in the Crystal Falls area of northern Stephens County, Texas. Another company is planning a gas line to the well as it produces gas with a natural gasoline yield of approximately 3 gal. per 1,000 cu. ft. Humble Oil & Refining Co., through Humble Pipe Line Co., is connecting its three-well shallow Bateman pool

of King County, Texas, which gave the county its first production. The line is a 14-mile 4-in. line from the company's Panhandle-Ranger system at Truscott station where the 32-gravity crude oil will be stored in a special 80,000-bbl. tank.

Texas Co.'s Chicago Products Line Is Nearing Completion

Nearly all of the pipe has been strung and approximately 80 per cent has been laid for The Texas Co.'s 34-mile 6-in. refined products line from Lockport, Ill., to East Chicago, Ind., which has been contracted by Morrison Construction Co.

Ohio Will Build 115-Mile Illinois-Indiana Line

Construction is scheduled to start in September for a 115-mile 8-in. refined products line for The Ohio Oil Co. from Robinson, Ill., to Indianapolis, Ind. Completion is reported scheduled for October or November. According to reports the laying of the line has been contracted by Sheehan Pipe Line Construction Co.

Senate Seeks Data on Tennessee Gas Line

A Senate interstate commerce subcommittee called Curtis B. Dall, former president of Tennessee Gas & Transmission Co., who appeared at a hearing in Washington, D. C., last week regarding the conditions under which the company obtained its permit from Federal Power Commission and financed the project for building a 1,200-mile 24-in. Texas-West Virginia line now under construction.

In reply to statements made by Sen. E. H. Moore, Dall said that he and his associates had spent more than $500,000 in surveys, studies and other preparations for FPC hearings before permit was granted. Moore told the subcommittee that after ownership of the Tennessee Gas & Transmission Co. was acquired by Chicago Corp., the new owners negotiated a $44,000,000 Reconstruction Finance Corp. loan for the $50,000,000 project of which loan the Tennessee company had received $22,000,000.

Pan American Project to Be Completed in August

For Pan American Pipe Line Co.'s 36-mile 8-in. line from Willamar to Port Isabel, Tex., the program for construction has progressed sufficiently to indicate that the project will be completed in August.

The initial capacity will be approximately 10,000 bbl. per day which can be increased by the installation of additional pumping units to provide for larger shipments which may be expected in the future. Pumping equipment is to be installed initially at a station in the Willamar field. The line will be fed by a gathering system having four gathering stations.

United Loops System Near Mobile, Ala.

The United Gas Pipe Line Co. of Shreveport has made application for a War Department permit for laying 10-in. gas pipe lines on the bottom of the Mobile River about 12 miles northeast of Mobile, Ala.

The lines are part of the new 8-mile loop United is building on its Pensacola main line.

Pipe-Line Outlet for Lea Discovery Under Way

LOVINGTON, N. M.—Texas-New Mexico Pipe Line Co. has started construction of 2¼ miles of 4-in. lateral from the west edge of the South Lovington pool, Lea County, New Mexico, to the Fred Turner, Jr., 1-B State, discovery well 2½ miles west of the field. The oil will be run for the account of Sinclair Refining Co.

Artesia Pipe Line Co. will build 26 miles of 4-in. line to connect a group of isolated pools in eastern Eddy County. The system will be tied into the Continental Pipe Line Co.'s Loco Hills pool station.

Colonial Beacon Changes Plans for Products Line

Through changes in plans for acquiring right-of-way it is reported that Colonial Beacon Oil Co.'s 6-in. line from Everett to Waltham, Mass., will be 13 miles in length rather than 10½ miles as originally planned. This line is part of a project for laying 36 miles of 4-in. and 6-in. from Everett to Methuen, Mass. No information is available as to the date for which completion is scheduled.

Wisconsin Southern Gas Hearing Is Postponed

WASHINGTON. — Federal Power Commission this week heard oral arguments before the commission en banc on applications filed by Wisconsin Southern Gas Co. The applicant asked the commission (1) to order Natural Gas Pipe Line Co. of America to extend its facilities to a point of connection with the applicant's proposed facilities near Genoa City, Wis., and to deliver natural gas to meet the demands on the applicant's system, and (2) to authorize Wisconsin Southern to construct and operate approximately 10 miles of 4-in. pipe line extending from Lake Geneva, Wis., to the Wisconsin-Illinois State line near Genoa City to connect the applicant's distribution system with the Natural Gas Pipe Line Co. of America pipe-line facilities.

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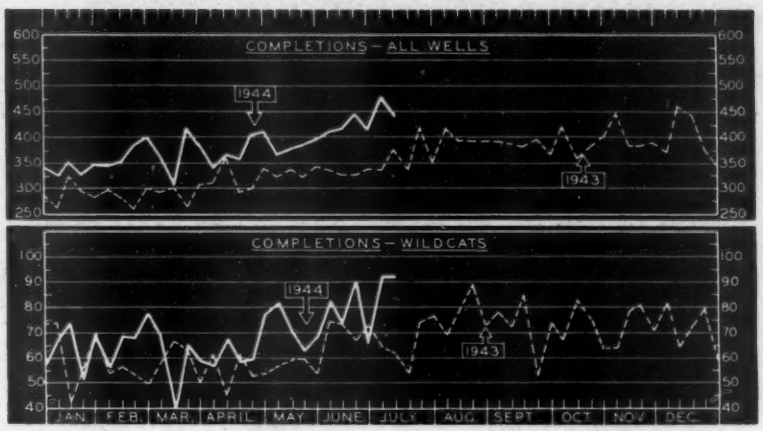
Exploration and Drilling

Week's Highlights

EASTERN Texas oil exploration has been given additional impetus by a new Glen Rose lime field, discovered by Phillips Petroleum Co., 5 miles south of Tyler. Phillips 1 McMinn celebrated July 4 by flowing 95 bbl. of 40-gravity oil in 12½ hours from the Glen Rose of Lower Cretaceous age. The test is on a structure originally discovered by subsurface mapping, followed by core drilling and seismograph shooting.

This points up the fact that the modern geologist uses a combination of methods and tools, in which each one adds some information to the total. Actually the total factual data is greater than the sum of the separate parts, because usually each geological technique indicates some uncertain possibilities, some probabilities and some facts. When the facts, the probabilities and the possibilities indicated by each method are assembled and compared by the geologists, a composite picture begins to emerge. Possibilities indicated by one technique are canceled out by facts obtained by one of the other methods; or they may be reinforced by data brought to light by a different geological tool. Probabilities go through the same process, some being canceled out and others so strengthened by additional data that they can be rated as factual. In this case the sum total added up to a successful wildcat and a new oil pool.

The fact that production is from the Glen Rose of Lower Cretaceous, rather than the Woodbine of Upper Cretaceous, will encourage more exploration. While the Glen Rose has produced in other parts of the East Texas regional basin, most of the production has been Woodbine. Enough fields have already been found to prove the existence of a petroliferous region in the basin, to some extent paralleling the Balcones fault zone that marks the west edge of the basin. If the Glen Rose as well as the Woodbine is to be found productive fairly frequently, this doubles the chances on any given structure.



Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

Week Ended July 8, 1944

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.	45	15	3	63	106,581	1,630*	1,709
Ohio	6	7	10	23	59,210	478	427
Indiana	2	1	1	4	6,637	106	121
Kentucky	12	2	6	20	35,470	344	184
Illinois	19	0	12	31	90,695	877	862
Michigan	4	2	11	17	31,909	315	263
Kansas	20	0	24	44	151,293	904	799
Nebraska, Missouri, Iowa	0	1	0	1	200	16	23
Oklahoma	28	3	15	46	203,231	845	565
Texas:							
North Central	28	0	6	34	122,948	716	853
West	17	1	4	22	106,749	778	429
Panhandle	5	0	0	5	15,262	100	92
Eastern	6	2	7	15	88,284	175	137
Gulf Coast	10	0	9	19	124,085	560	220
Southwest	5	0	6	11	50,901	385	453
Total Texas	71	3	32	106	508,209	2,714	1,984
Louisiana:							
Northern	4	2	3	9	30,555	147	157
Southern	7	0	4	11	100,384	237	188
Total Louisiana	11	2	7	20	130,939	384	345
Arkansas	4	0	1	5	33,962	107	125
Mississippi	0	0	1	1	5,580	59	49
Southeastern States	0	0	2	2	10,730	17	†
Montana	3	0	3	6	13,775	158	98
Wyoming	3	0	0	3	17,555	82	54
Colorado-Utah	0	0	0	0	0	15	8
New Mexico	3	0	0	3	11,230	206	111
California	28	1	15	44	165,734	1,002	656
Total United States	259	37	143	439	1,582,940	10,260	8,383
Total previous week	277	46	147	470			
Total July 10, 1943	199	50	120	389			

*Does not include 46 pressure wells. †Included in total shown for Mississippi.

KANSAS

Ness County Gets New Mississippi Lime Pool

NESS County got a new Mississippi lime pool when Skelly Oil Co. 1 Norton, NW NW NW 23-17-26w, pumped 84 bbl. in 24 hours after acidizing with 1,500 gal. at 4,458-70 ft. In Phillips County, Texas Co. 1 Witt, SW SW SW 35-5-20w, was testing saturation found in the Reagan sand, topped at 3,552 ft., and cored from 3,554-59 ft.

Among the completed wildcats for the week, the results were disappointing, all 10 being dry. Of the 34 field completions, 20 were oil producers, 14 were dry holes. Twenty-nine new field locations were made during the week and 7 new wildcat locations staked.

Stafford County had 3 of the best completions of the week: Isern Brothers 2 Muellar, SE SW SE 29-21-12w, Muellar pool, was given a potential of 2,260 bbl. from Arbuckle pay at 3,584-91 ft.; Stanolind Oil & Gas Co. 3 Fischer, NW SE SW 31-21-12w, Fischer pool, rated a potential of 1,279 bbl. from Arbuckle pay at 3,618-22 ft., while Republic Natural Gas 1 Volker, E½ SE SW 36-23-11w, Zenith-Peace Creek pool, had a potential of 1,872 bbl. from Viola pay at 3,719-27 ft.

In Barton County, Continental and Phillips Petroleum Co. 1 Monroe, SE NW SE 4-18-14w, Boyd pool, had a potential of 893 bbl. from Arbuckle pay at 3,417-40 ft. The other outstanding completion of the week was in the Morel pool of Graham County, where R. W. Shields 1 Boland, SE NW NE 16-9-21w, drew a potential of 889 bbl. from Arbuckle pay at 3,674-93 ft.

KANSAS WILDCAT COMPLETIONS

Barton County: John Lindas & Keyes Drilling Co. 1 Klepper estate, N½ NE SE 7-20-12w, dry, TD 3,492 ft., Arbuckle 3,440 ft.

Dickinson County: Westgate-Greenland 1 Lockhart, E½ NE SE 11-16-2e, dry, TD 2,418 ft., chat 2,378 ft.

Kiowa County: Vierson & Cochran 1 Johnson, NE NE SE 22-28-18w, dry, TD 5,328 ft., Arbuckle 5,272 ft.

Pratt County: Phillips Petroleum 1 Levick, SW SW NW 29-28-13w, dry, TD 4,580 ft., Arbuckle 4,566 ft.

Rooks County: N. Appleman 1 Poague, SE SE SE 27-10-20w, dry, TD 3,820 ft., Arbuckle 3,778 ft.

Rush County: Wolf Creek 1 Carman, SE NW NE 25-16-20w, dry, TD 3,962 ft., Arbuckle 3,862 ft.

Saline County: Barbara Oil 1 Cussick, NE SE NE 33-13-1w, dry, TD 3,400 ft., Arbuckle 3,370 ft.

Shawnee County: Skelly Oil 1 Meyer, NW SE SW 13-10-13e, dry, TD 3,147 ft.

Stafford County: Helmerich & Payne & Phillips 1 Johnson, SE SE NE 35-23-13w, dry, TD 3,975 ft., Arbuckle 3,959 ft.

W. P. Faulkner 1 Russell, SE SW NW 33-24-13w, dry, TD 4,240 ft., Arbuckle 4,219 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Cities Service Oil Co. was about to run a pumping test at its 2 Wallace Watkins in C NW SE NW 32-65n-39w, Atchison County, Missouri, in the Tarkio pool. The Bartlesville pay was topped at 1,391 ft. The company's 3 Watkins, in NW SW NW 32-65n-39w, had the Bartlesville sand at 1,434 ft. and set 5½-in. pipe at that point. No. 3 is a west offset to 1 Watkins and No. 2 is an east offset to No. 1.

In the McLouth pool of Leavenworth County, Kansas, R. L. Campbell of St. Joseph had a dry hole at 1 Figgs in C S½ 3-10s-20e. The Bartlesville sand was topped at 1,437 ft. and had a showing of oil. A steel-line correction made 1,472 equal 1,460 and the Mississippi lime top was given as 1,460. The hole went to 1,632 ft.

Tools were removed from the Ed Jackson et al 2 Lobb location in C SW SE of 3-10s-20e, Leavenworth County. The test had been spudded and shut down.

McLaughlin 1 Farrar in C NE SW 5-10s-21e, Leavenworth County, was a dry hole at 1,488 ft., total depth. The 8-in. pipe was set at 705 ft. and the Mississippi lime was topped at 1,294.

Skelly Oil Co. had a dry hole in Shawnee County, Kansas, at 1 Meyer in NW SE SW 13-10s-13e. The Mississippi lime was topped at 2,094 ft., the Hunton at 2,523, the Simpson sand at 2,997 and the Arbuckle lime at 3,067. Total depth was 3,147 ft.

J. M. Huber 1 Community, in NW 33-12-11e, Wabaunsee County, Kansas, set 10-in. pipe at 540 ft. and was drilling at 550 ft.

DAILY AVERAGE PRODUCTION FOR WEEK

	July 8 crude oil	Distillate, allied products	July PAW quota all oils	July 1 crude oil
Arkansas	80,400	4,500	82,500	80,300
California	848,650	50,700	904,200	849,550
Colorado	6,950	.....	7,400	7,850
Eastern	67,600	6,200	77,400	67,000
Illinois	207,450	11,500	226,500	208,550
Indiana	12,650	.....	14,600	12,850
Kansas	266,200	5,000	279,000	274,700
Kentucky	21,000	2,200	24,200	21,800
Louisiana	360,050	45,000	395,000	361,550
North Louisiana	71,300	.....	.....	72,800
South Louisiana	288,750	.....	.....	288,750
Michigan	51,400	200	51,200	51,900
Mississippi	44,150	.....	41,000	43,900
Montana	26,350	300	24,700	24,400
Nebraska	900	.....	1,000	1,000
New Mexico	108,150	5,000	118,000	108,200
Oklahoma	337,900	27,000	359,000	338,300
Texas	2,036,400	140,000	2,204,000	2,036,400
East Texas	360,550	.....	.....	360,550
East Central Texas	145,000	.....	.....	145,000
North Central Texas	149,400	.....	.....	149,400
Texas Panhandle	92,150	.....	.....	92,150
West Texas	447,900	.....	.....	447,900
South Central (San Antonio)	19,650	.....	.....	19,650
South Texas (Laredo)	77,500	.....	.....	77,500
Lower Gulf Coast	215,800	.....	.....	215,800
Upper Gulf Coast	528,450	.....	.....	528,450
Wyoming	87,350	4,000	98,000	94,250
Total United States	4,563,550	301,600	4,907,700	4,582,500
Total production January 1-July 8, 1944				846,251,801 bbl.
Same period last year				741,781,890 bbl.

SOUTHWEST TEXAS

Victoria County Test May Open a New Area

CORPUS CHRISTI.—Kingwood Oil Co. 1 Wilden, about a mile west of the Victoria field, and 2 miles southwest of the town of Victoria, Victoria County, is still taking preliminary gage, but after perforating in the sand at 4,777-87 ft., was flowing at the rate of 5 bbl. hourly through a ⅛-in. choke, with no pressures or ratio estimated, and should open a new area, since it is said to be producing from a different sand from that which wells in the Victoria field produce. Total depth is 4,907 ft., and a drill-stem test at 4,777-83 ft., taken at the time the sand was cored, showed 1,300 ft. of 24.5° gravity oil and oily mud.

Northern Ordnance, Inc. 1 Schaeffer, 1½ miles from the discovery well in the Mission Valley field, is drilling ahead below 9,280 ft., after reporting showings of condensate in sand around 8,550 ft.

About a mile northwest of the North Magnolia City field, in Jim Wells County, H. H. Howell 1 Lorena J. Spoonts is running potential test, and will probably ask for a new-pool allowable. Total depth is 5,887 ft. with 5½-in. casing cemented at 5,560 ft. and perforated at 5,443½-50 ft. On first 24-hour gage it flowed 155 bbl. of oil through a ½-in. choke with tubing pressure 550 lb. and casing pressure 600 lb. Locations are already being discussed for offsets to this well, to be drilled by Edwin M. Jones, and by Anderson-Prichard.

In Nueces County, Seaboard Oil Co. of Delaware 52 James P. Luby is preparing to perforate for a production test of deep sand in the old Luby field. The well was drilled to a total depth of 9,455 ft. with casing set to 9,453 ft. just off bottom. Stanolind Oil & Gas Co. 1 Kerr, 1½ miles east of the company's deep discovery in the Riverside area, is drilling ahead below 7,345 ft. in hard shale.

In Goliad County, Transwestern Oil Co. 1 J. F. Wood 1,150 ft. south of production in the Slick-Wilcox field, was flowing at the rate of 9 bbl. hourly through a 5/32-in. choke while completing in the Wilcox sand. Casing was perforated at 7,635-40 ft., total depth being 7,667 ft.

In Karnes County, Magnolia Petroleum Co. 2 Russell-Atkinson, 1,798 ft. west of the discovery well for the Green field, was dry at total depth of 6,825 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Bexar County: Caldwell 1 Stanfield, J. H. Lucas Sur., 740 ft. E of Foster Road, dry at 580 ft.

Lee County: Seaboard Oil Co. of Delaware 1 O. Kissman estate, 2 mi. S of Lincoln, J. Price Sur., dry at 4,495 ft.

Live Oak County: R. P. Brewer, Jr., and Newman Bros. Drlg. Co. 1 Natalia Meirath et al, 5 mi. SW of Mikeska, SK&K Sur., dry at 4,500 ft.

Webb County: Magnolia Petroleum Co. 4 Garcia-Aribba, 7 mi. SW of Bruni, Albercas de Arriba grant, dry at 3,076 ft.

Karnes County: Magnolia Petroleum Co. 2 Russell-Atkinson, Carlos Martinez grant, dry at 6,825 ft.

Wilson County: H. A. Rice 2 Dr. S. C. Scull, 3½ mi. NE of Lavernia, Manuel Ximinez grant, TD 1,492 ft., set perforated liner, PT 5 bbl. day pumping.

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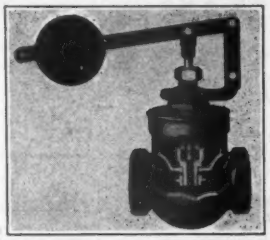

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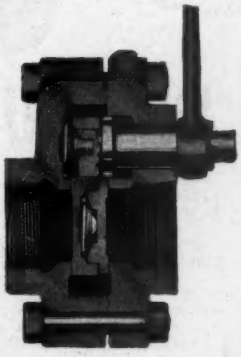

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ROCKY MOUNTAIN

Bell Rock Structure Test Is at Critical Stage

DENVER. — An important wildcat in northwestern Colorado which is at a critical stage is Stanolind Oil & Gas Co. 1 Hanewalt, NE SE SE 4-6n-92w, on the Bell Rock structure near Craig, a joint test with Continental Oil Co. and Ohio Oil Co. The objective is the Sundance. It picked up a sand, tentatively identified as the Dakota, at 8,066 ft. and drilled 2 ft. to 8,068 ft., when the hole began showing gas. No test was made, and the well was shut down to condition the hole before drilling deeper. The well is 100 ft. from a test drilled in 1930 by the old Midwest Refining Co., which showed for 35,000,000 cu. ft. of gas in the Mesa Verde at 2,890 ft., but hole was lost before it reached its objective in the Morapas sandstone.

Little Buffalo Basin well big producer. Stanolind 2 Unit, NE NE NW 12-47n-100w, Little Buffalo Basin field, Park County, Wyoming, definitely proves the Tensleep horizon to be a prolific producer on that structure. On a swabbing test it made 75 bbl. an hour through the 2½-in. tubing. Total depth is 4,581 ft., and top of the Tensleep was at 4,463 ft. The structure has been producing gas from the Frontier formation for 30 years. A discovery in the Tensleep a mile to the south of the new well was made late last year in Fred Goodstein 1 Pedley-Government, making 180 bbl. on the pump. The Stanolind well is approximately 450 ft. higher on structure. Both wells found gas in horizons below the old Frontier gas cap. Stanolind well had 20,000,000 cu. ft. in the Lakota at around 2,500 ft., and the Goodstein well had big gas in the Dakota. Stanolind is rigging up for 3 Unit, ⅛ mile north of 2 Unit, and Goodstein is preparing to make another location on the Pedley lease. The new field will soon have a pipe-line outlet through the Stanolind line under construction from Elk Basin.

Golden Eagle preparing to test.—Pioneer Oil Corp., which last week brought in a new oil field on the Golden Eagle dome, Hot Springs County, Wyoming, in its 1 Unit 1, C NE SW 12-45n-97w, is setting a high-pressure separator and testing equipment preliminary to making a production test. The well made 3,500,000 cu. ft. of gas and 250 bbl. of 58-gravity oil in a 12-hour test through a choke on the tubing from the Muddy sand at 6,724-70 ft.

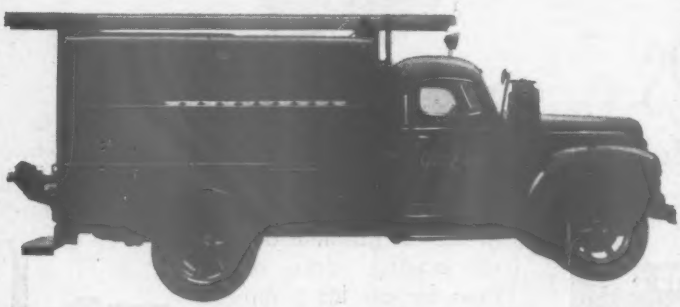
Producer at Gebo. — Continental has a near completion on the Gebo dome in its 3 Gebo unit, SW SE NW 23-44n-95w, which topped good saturation in the Embar at 4,576 ft., and continuing to 4,664 ft. A second saturated horizon was picked up at 4,674-96 ft. It is preparing to run casing and test the Tensleep before completing in the Embar.

Three wildcats under way.—Three important wildcats in Wyoming are getting under way. Husky Refining Co. 1 Kinney-Coastal, SW SW SW 20-46n-98w, flank test at Grass Creek to determine productive area of the Embar-Tensleep preliminary to unification of the field, has spudded. Kerlyn Oil Co. 1 Shoshone, C NE NE 16-5n-2w, on the Sheldon dome, Fremont County, in which Carter Oil Co. owns a 30 per cent interest, has set surface pipe. It will go to the Tensleep. Dickey Oil Co. is building rig for a 7,000-ft. test to the Pennsylvanian in the Shawnee district near Douglas in 1 Government, C NE SW 27-32n-69w.

Southwest New Mexico wildcat.—Haddock Construction Co. is drilling at 5,315 ft. in gray lime and sandy shale in 1 Fuqua, NE NE 19-5n-3e, Tome grant, Valencia County, New Mexico, under a contract to go to 6,500 ft.

MONTANA WILDCAT COMPLETION

Brady Block, Pondera County: Texas 2 Schlepp, SW NE SE 22-27n-2w, plugged and abandoned at 1,486 ft.



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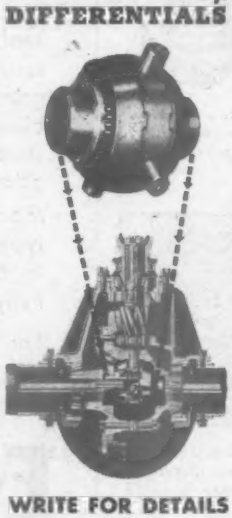

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SOUTH LOUISIANA

Humble Discovery Marks Second in Two Weeks

NEW ORLEANS.—Discovery by Humble Oil & Refining Co. of a new oil field for their second in as many weeks, extension of production in two other fields, and reports of oil showings in another wildcat highlighted the news in Southern Louisiana.

Humble 1 Adam Hymel is moving the rig off after completing to open a new gas-distillate field in the Laurel Ridge area, Iberville Parish. Total depth is 10,846 ft., casing being landed at 10,737 ft., and perforated at 10,688-705 ft. for the production test. During the 24-hour test it flowed 133 bbl. of 49.5-gravity condensate through a ¼-in. choke with tubing pressure 3,100 lb., casing sealed. Gas-oil ratio 50,000 to 1. No locations have been announced for new tests in the immediate area. Also in Iberville Parish, Humble is dredging canal to move in rig east of the recently discovered production on the north flank of the Bayou des Glaise dome.

In St. Charles Parish, on the Good Hope prospect, Pure Oil Co. 1 General American Transportation Co. is drilling below 8,900 ft., with no further showings reported after having found showings of oil in a sand at 7,850 ft. No drill-stem test was attempted, however, and operators will drill ahead to projected depth

before running final electric log and possibly testing all shows.

Sun Oil Co. has extended the Egan field of Acadia Parish with 1 C. J. Freeland, which was completed during the week through casing perforations at 10,765-775 ft., flowing 217 bbl. of 35.6°-gravity crude oil per day through a ½-in. choke with tubing pressure 1,725 lb. and gas-oil ratio 690 to 1. This is the first crude-oil production for this field, the other two producers being condensate wells, completed in sands at 10,480-500 ft. and 10,610-625 ft. The new producer opens the third sand for this field and extends production 1½ miles in a northeasterly direction.

Sun had also apparently extended production in the Cankton field, St. Landry Parish, one location to the south with completion of 1 Laurent Patin through perforations at 9,710-20 ft. but the well started showing salt water along with the oil the next day after it was brought in, and will have to make a squeeze job before testing again. It will probably be completed as a producer. This is from the same sand as the discovery pay, but evidently ran much lower on structure.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Cameron Parish: Continental Oil Co. 1 McCain estate (Mrs. Nona M. Hennington), 21-12s-8w, dry at 9,653 ft.

APPALACHIAN FIELD

Third Test Reaches Oriskany Sand

PITTSBURGH.—In West Virginia, the Oriskany test of the Hope Natural Gas Co. on Big Run Oil Co. (Joanna Drake) in Williams district, Wood County, drilled through the Oriskany sand which was dry. The Corniferous lime was topped at 4,660 ft., Oriskany 4,806-40 ft., total depth 4,851 ft. This is the third to reach the sand and the second dry hole. The first will hardly make a commercial well.

In Flemington district, Taylor County, Pittsburgh and West Virginia Gas Co. completed a fair gas well, a test on U. S. Morrow farm, in the Fifty Foot sand, total depth 1,852 ft., and gaging 1,819,000 cu. ft.

In Gilmer County, Carnegie Natural Gas Co. completed a shallow First Salt sand gas well on Jarvis and Shiflett farm in Center district with a gage of 1,212,000 cu. ft. gas, total depth 906 ft.

In Boone County, Hope Natural Gas Co.'s test of Loup Creek Colliery Co. tract in Crook district topped a sandy formation at 2,140 ft. with gas at 2,168-72 ft. and again 2,172-74 ft. It gaged 582,000 cu. ft. with a 300-lb. rock pressure in 1 hour.

In Wyoming County, Hope Natural Gas Co. completed 8,868 Loup Creek Colliery Co. in Oceana district at 1,983 ft. A sand at 1,855-1,915 ft. showed 581,000 cu. ft. gas from 1,884-1,904 ft. It was shot with a tamped shot which has not yet been tested as the bridge is still in the hole.

In Putnam County, Cumberland Gas Co. is ready to test the Oriskany sand in No. 2 Raymond City Coal & Transportation Co. in Pocatalico district with 7-in. casing set at 4,600 ft. with the top of the Corniferous lime at 4,581 ft.

In Jackson County, Hope Natural Gas Co. is drilling the Clinton test on the B. M. Pfost farm in Washington district at 6,842 ft. and in white sand. It is 843 ft. below the base of the Newburg dolomite.

In southwest Pennsylvania, the deep tests are all at an unimportant stage or down with trouble. No new wells were reported in shallow areas.

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CALIFORNIA

Tide Water Completes Flowing Well in Jacalitos District

LOS ANGELES.—Of importance this week was the completion of a semi-wildcat by Tide Water Associated Oil Co. in the Jacalitos district of Fresno County, flowing at a daily rate of 1,140 bbl. of relatively clean 32.9°-gravity oil from the Temblor of Miocene age. This well was bottomed at 3,827 ft. and is producing from 227 ft. of formation although not all of this interval was oil sand. This is the largest flowing well completed in the Jacalitos area since Wilshire-Annex Oil Co. found the Temblor productive over a year ago. Associated's new producer is located in 16-21s-15e and geographically is about 2 miles northwest of the discovery well of Wilshire-Annex and about 1 mile east of a gas well recently completed by Standard Oil Co. of California in 17-21s-15e.

Plans are under way to immediately get started on the development program involving the Elk Hills field of Kern County where Standard will drill a total of 300 new wells for the Navy during the next 10 months in order to increase production of this field from approximately 15,000 bbl. daily to 65,000 bbl. per day. Construction and road crews are already in the field and the first well will probably be spudded within another fortnight. Standard will do this drilling on an actual cost basis with no allowance for overhead or supervision.

Seaboard Oil Co. has finally abandoned its Elysian Park wildcat in basement slate at 2,300 ft. The company has filed application for authority to locate a second well in Chavez Canyon and to whipstock beneath the park property.

Development work is showing a substantial increase in the Buena Vista fi of Kern County where Standard found a new productive sand several months ago Three operators are now involved in this drilling and all will increase the scop of work immediately. This work is bein done on the United anticline which form the most northerly productive section o Buena Vista Hills and drilling continues to expand the potentially productive area At present, it is estimated 800 acres hav been proved productive but this will be increased within the next 10 days as two additional wells are in the pay at present and scheduled for early completion.

Independent Exploration Co. extended the productive limits of the Premier section at Poso Creek to the west by completing 33 Conoco in 33-27s-27e flowin 165 bbl. of 131.1°-gravity oil daily from 2,352 ft. This well is located on acreag acquired on a lease from Continenta Oil Co. Productive oil sand was cored at 2,277-344 ft. indicating 67 ft. of formation open to production. Due to inadequate storage, a production test will be made later.

South of Superior Oil Corp.'s productive property at Cymric, Universal Consolidated Oil Co. has finished two new wells and is proceeding with additional work. Due to faulting, it is necessary to drill until the edge of the area is located. The pay is reached at 1,400 ft.

CALIFORNIA WILDCAT COMPLETIONS

Casmalia outpost well, Santa Barbara County: Richfield 1 Escolle, 20-9n-34w, dry in gray sand and shale, bailed water with trace of oil 2,250-3,150 ft., TD 5,808 ft.

Castaic wildcat district, Los Angeles County: Morse-Mangold Oil Co. 1 Castaic, 26-5n-17w, dry in hard gray Miocene sand, only minor showings logged. TD 4,315 ft.

Coalinga, east, outpost, Fresno County: Texas 58-21 S.P., 21-19s-16e, dry in gray sand, form. test 9,410-36 ft. flowed water, TD 10,558 ft.

Curry Hills wildcat district, Fresno County: Standard 1 Wells-Fargo Bank, 30-21s-15e, dry in gray sand, no showings, TD 3,361 ft.

Harbor City wildcat district, Los Angeles County: Hunsaker & Atha 1 Harbor, 27-4s-14w, dry in hard gray sand, no important showings, TD 3,380 ft.

Loma Verde wildcat district, Los Angeles County: Shell-Continental, 86-20 S.C. 20-5n-17w, dry in gray sand, no showings, TD 7,006 ft.

Los Alamos wildcat district, Santa Barbara County: Southern California Petroleum Corp. 1 Archambeault, 3-7n-32w, dry in hard gray sand, only minor showings logged, TD 4,765 ft.

Los Banos wildcat district, Merced County: Shell 61-3 Wolfsen, 3-9s-11e, dry in sand and shale, no showings during drilling, side-wall samples showed nothing, TD 4,484 ft.

Martinez wildcat district, Contra Costa County: Cal-Bay Corp. 1 Martinez, 21-2s-1w, dry in gray sand, no showings of oil or gas, TD 4,375 ft.

Sheep Springs wildcat district, Kern County: Rothschild-Bender Oil Operations 1 Sheep Springs, 17-29s-21e, dry in gray sand, no showings, TD 3,312 ft.

Tracy wildcat district, San Joaquin County: Standard 1 Gerhard Comm., 24-2s-5e, dry in gray sand, no showings, TD 5,900 ft.

TEXAS GULF COAST

Deep Test Possible for Beeck Creek Field

HOUSTON.—American Republics Corp. and Houston Oil Co. have picked up the discovery sand in 2 H&TC fee, second test in the new Beeck Creek field in the northern part of Hardin County, at 6,240-46 ft., showing oil and running just about level with the discovery well, but operators were still drilling ahead at the close of the week, having already passed the depth at which the other sands in the Cockfield are to be expected. It may be made a deep test for the area.

In the southwestern part of the county, a failure has been registered in Shell Oil Co., Inc. 1 Kirby Lumber Co., which drilled to 9,097 ft.

Shell 1 Hill State Bank, wildcat southwest of Rock Island, reported several weeks ago as opening a new condensate area in Colorado County, has made dual completion in two Wilcox sands, perforating at 9,340-84 ft. to test 210 bbl. of condensate plus about 25 bbls. of salt water a day through ⅛-in. choke with gas-oil ratio over 22,000 to 1. Lower sand section was perforated from 10,194 ft. to 10,422 ft. at intervals, and flowed 125 bbl. daily through ¼-in. choke with tubing pressure 3,490 lb. Gravity from lower pay is 54°, and gas-oil ratio 42,000 to 1. Rig is being moved in for Tide Water Associated Oil Co. 1 Underwood, west of the new Shell discovery and northwest of the town of Sheridan in the west edge of Colorado County.

Glenn H. McCarthy, Inc. 1 Maco Stewart, Galveston County's deepest well, in the Hitchcock field, continues to test showings in the lower part of the hole, now testing below 11,000 ft., after tests at levels below 12,000 ft. failed to show oil or gas. Reports indicate it could produce from 7,500 ft. if nothing is found below that depth.

Location for an interesting wildcat test was made in Jefferson County by Butcher-Arthur, Inc. in 1 Security Bank & Trust Co., about 7 miles south of Nome and 6 miles northwest of Winnie. It is on one of the old Gulf Coast prospects in the extreme western part of the county and will go to a depth of 10,000 ft., for a test of sand sections producing in the Stowell and North Winnie fields to the southwest.

UPPER GULF COAST WILDCAT COMPLETIONS

Brazoria County: Continental Oil Co. 1-A Ramsey State Prison Farm, Lochridge area, Stephens Richardson Sur., dry at 9,310 ft.

Grimes County: Northern Ordnance, Inc., 1-B J. M. Quinn, Yarboro area, S. F. Austin Sur., dry at 3,850 ft.

Jackson County: Ray Reynolds and Roxie Wright 1 O. S. York et al, 2¼ mi. SE of Ganado, W. D. Sutherland Sur., dry at 6,915 ft.

Jackson County: Butcher-Arthur, Inc.,-Salt Dome Oil Corp. 1 J. W. Young estate, W. P. E. Heard League, 4 mi. E of Edna, dry at 6,586 ft.

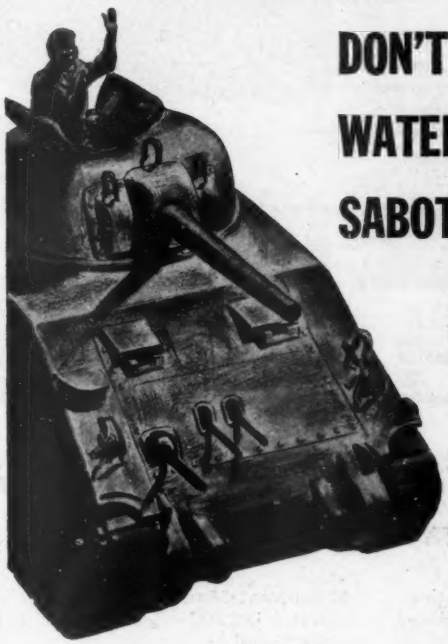
MICHIGAN

Auction Shows Interest in Northeastern Areas

SAGINAW.—Increasing interest of oil operators in northeastern Michigan areas is reflected in results of the state conservation department's latest auction of oil and gas lease rights on state-owned acreage. Bidders offered bonus totaling $4,421 for leases on 72,348 acres in 21 counties, the department's lands division announced, adding that the demand was greatest in Goodar Township, Ogemaw County, Markey Township of Roscommon and Mento and Big Creek of Oscoda.

State revenues from bonuses, rentals and royalties are expected to exceed

Oil wins wars!



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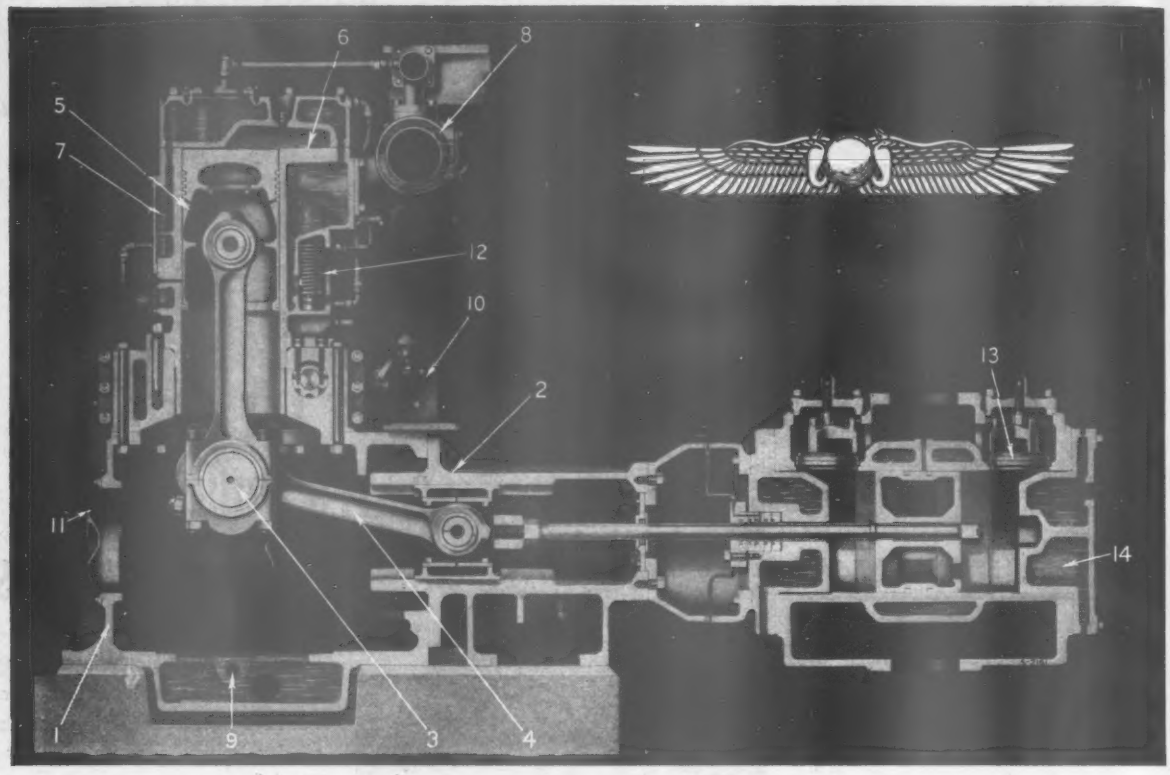
WORTHINGTON ANGLES WIN OUT!



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1. **Main frame.** Massive box girder type heavily ribbed—Fully machined in one machine tool setting.
2. **Compressor frames.** Bolted to the main frame—Permits more accurate machining and easier field handling.
3. **Crank Shaft.** One piece forged steel—Counterweighted.
4. **Connecting Rods.** Forged steel—Individual and completely interchangeable for each power and compressor cylinder.
5. **Power Piston.** Exceptionally long for minimum wear and minimum oil consumption.
6. **Inlet & Exhaust Valves.** Alloy forged steel—Interchangeable.
7. **Power Cylinders & Heads.** Completely water jacketed—Directed flow—Uniform temperatures.
8. **Exhaust Manifold.** Completely water jacketed—Less operator and fire hazard.
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10. **Force feed lubrication** to power cylinders, compressor cylinders and compressor cylinder packing.
11. **Complete accessibility** to all bearings through large crank case and compressor frame doors.
12. **Valve stems** completely accessible for prompt, accurate adjustment.
13. **Worthington Feather Valves*** in compressor cylinders for quiet, efficient, durable operation.
14. **Large water jackets** keep cylinder and head cooler . . . promote higher operating economy.

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GC4-1

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*REG. U. S. PAT. OFF.

$900,000 this year, according to Carl Wender, in charge of leasing. Last year oil and gas revenues paid $980,000 into the state general fund.

Four drilling permits were issued by the department last week. Locations are

(Continued on page 139)

N. CENTRAL TEXAS

Wichita County Wildcat Showing Oil in Ellenburger

WICHITA FALLS.—Maguire Industries 1 Cunningham-Swain, Section B, Tarrant County School Land Survey, 2½ miles northwest of Iowa Park, topped Ellenburger dolomite at 4,350 ft., showing oil from 4,354-66 ft. On 30-minute drillstem test at 4,351-66 ft. operators recovered 30 ft. slightly oil and gas-cut mud. On another test of 40 minutes, from 4,353-76 ft., 90 ft. oil and gas-cut mud were recovered. The test is bottomed at 4,424 ft., with 5½-in. casing cemented at 4,422 ft., which will be perforated.

King County.—Shamrock Oil & Gas Co. 1 R. B. Masterson, northeast part of the county, topped lime at 3,575 ft., and recovered 5 ft. of lime with slight show of oil in a core from 3,580-85 ft. It is drilling ahead.

Montague County.—Continental Oil Co. and Sinclair Prairie Oil Co. 1 Hundley, Martindale Survey, Simpson discovery, total depth 7,930 ft. in dry Ellenburger, plugged back depth 7,845 ft., swabbed 82.76 bbl. oil in 20 hours, and was preparing to acidize. Continental has announced plans to drill a test to 8,000 ft. 2 miles southwest of Bowie, 4½ miles northeast of Eanes pool. It is 1 McNutt, 330 ft. from north and east lines of S½ SE¼ Section 38, ET Ry. Co. Survey, Abstract 1,069.

Clay County.—Continental Oil Co. and Edge Oil Co. 1 Crockett, Section 3,245, TE&L Survey, perforated with 19 shots at 6,633-41 ft., and the hole filled 6,400 ft. with salt water. Packer was set at 6,614 ft., and casing will be perforated again. This wildcat is a new Simpson dolomite discovery.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: Consolidated Oil 1 Garrett, 330 ft. from N, 330 ft. from W, W 40 ac. of N 100 ac. of E 225 ac., John Walker Sur., elev. 1,020 ft., 112.28 bbl. 42° gravity, Strawn sand pay 3,780-3,900 ft., Caddo 4,603 ft., Mississippi 5,400 ft., Ellenburger 5,622 ft., TD 5,685 ft. Discovery.

Wayne King and W. Petre 1 Mrs. Carrie Threat, 200 ft. from S and E, 107-ac. tract, Sarrah J. Williams Sur., dry, TD 1,193 ft.

Montague County: Sinclair Prairie Oil 1 W. N. Templeton, 660 ft. from S, 810 ft. from W, 1,285 ft. from SW, 660 ft. from SE, Edw. Wingate Sur., 103.56 bbl. 38° gravity, Bend pay 6,040 ft., perf. 40 shots 6,040-59 ft., TD 6,117 ft. Discovery.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Jones County: Eason Oil and Jones & Stasney 1 J. D. Freeman, 1,930 ft. from S, 660 ft. from W, Sec. 263, H. Virm Sur., elev. 1,762 ft., pump 15 bbl., pay 2,794 ft., TD 2,813 ft. Discovery.

Shackelford County: Ungren & Frazier 1 E. T. Reves, 85-ac. tract, Sec. 14, Blk. 3, H&TC Ry. Sur., dry, TD 3,266 ft.

Stephens County: Cherry & Kidd 1 J. D. Miles, Sec. 45, Blk. 7, T&P Ry. Sur., dry, TD 3,730 ft.

Northern Ordnance 1 S. P. Robertson, 1,000 ft. from S, 330 ft. from W, Sec. 1142, TE&L Sur., elev. 1,117 ft., IP 101 bbl., Caddo lime pay 3,222 ft., TD 3,236 ft. Discovery.

Taylor County: R. B. Farris and A. P. Carr 1 Mrs. Mattie Antilley et al, 148-ac. tract, Sec. 44, Blind Asylum Sur., elev. 1,769 ft., dry, TD 2,125 ft.

EASTERN TEXAS

Two Important Deep Discoveries in East Texas

DALLAS.—Last week saw two important new discoveries for the East Texas district, which previously this year had failed to yield new fields of importance. In Smith County, what promises to be one of the most important strikes in years is Phillips Petroleum Co. 1 McMinn, Marsh Long Survey, near Greshame, which flowed 95 bbl. 40-gravity oil in 12½ hours through ¼-in. (some reports say ⅛) choke with 4,600-lb. pressure on tubing. This flow came through perforations in casing at 9,918-29 ft., opposite Coquina lime of lower Glen Rose formation. This formation was logged from 9,865 to 9,960 ft. The well was drilled to 10,001 ft., and Pettit and Travis Peak formations are reported to offer possibilities of production and are to be tested. It is 10 miles west of most southerly producers in the Chapel Hill field, and is near the center of a 13,000-acre block held by Phillips. The well was shut down for several months pending curing of titles. Royalty is reported to have sold under the well site before testing for $700 per acre.

Bowie County.—The other important

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Hugh Robinson, Service Engineer
Blackwell, Okla.
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Southwest Texas District
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W. H. Ward, Service Engineer
417 Lake Street
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development for the week was Barnsdall Oil Co. 2 Louis Heilbron, M. H. Janes Survey, 5 miles southwest of Texarkana. This well, drilled only 800 ft. west of a dry hole to the Smackover, had showings of oil in cores from 7,662-81 ft., in Smackover dolomite topped at 7,645 ft. Attempt to drill-stem test failed, and the well will be carried a few feet deeper and electrical survey made to determine casing point. The shows thus far encountered are believed sufficient to assure a producing well, which will be the first Smackover lime producer in Texas. The first well, drilled to 7,836 ft., had some shows in this horizon, of 14-gravity oil, but was some 60 ft. lower on structure than the new prospective discovery.

Wood County.—Shell Oil Co., Inc. 1 Whatley, deep discovery in Manziel field, was finally completed for 40.5 bbl. per day on pump, from pay at 8,455 to 9,005 ft., total depth. It has been testing for some weeks in an effort to boost production.

EAST TEXAS WILDCAT COMPLETIONS

Lamar County: Clark & Ogg 1 Smiley, J. R. and R. B. McColley Sur., 8 mi. W Paris, elev. 582 ft., Austin 335 ft., base Austin 395 ft., Woodbine 947-76 ft., Goodland 1,830-40 ft., Paluxy 1,860-70 ft., Paleozoic 3,248 ft., dry, TD 3,351 ft.

Panola County: Southport Oil 1 Scharnaegle, 200-ac. tract, Catherine Lindsey Sur., 16 mi. W by S Carthage, elev. 381 ft., Massive anhydrite 5,580 ft., Pettit 6,320 ft., Travis Peak 6,960 ft., Rodessa 5,665 ft., dry, TD 6,917 ft.

Smith County: Bobby Manziel 1 J. L. Morrison, S. J. Lott Sur., Friendship area, elev. 382 ft., Woodbine 3,780 ft., Georgetown 4,153 ft., Goodland 6,295 ft., Paluxy 5,368 ft., Massive anhydrite 7,010 ft., base Massive 7,240 ft., Pettit 7,908 ft., Travis Peak 8,067 ft., dry, TD 8,109 ft.

Titus County: Ryan Consolidated Pet. 1 Smith, 50-ac. tract, Ben Clark Sur., elev. 371 ft., Woodbine 3,780 ft., Eagleford 3,350 ft., Georgetown 4,130 ft., dry, TD 5,309 ft.

Van Zandt County: A. F. Richardson 1 Isaac Turner, 66-ac. tract, J. E. Moore Sur., 2 mi. S Grand Saline, elev. 452 ft., Pecan Gap 2,675 ft., Woodbine 4,975 ft., dry, TD 5,010 ft.

Wood County: Deeper pay discovery: Shell Oil 1 J. C. Whitley, 769 ft. from N and W, 99.04-ac. tract, J. Polk Sur., elev. 461 ft., pump 40.5 bbl. 43° gravity, pay 8,455 ft., TD 9,005 ft. Discovery new pay.

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WORM DRIVE WINCH

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PEORIA 1, ILLINOIS

PERMIAN BASIN

Several Wildcat Prospects Make Encouraging Tests

MIDLAND.—Humble Oil & Refining Co. 1 O. W. Williams, a wildcat 6 miles northwest of Fort Stockton, in Section 3, Block 114, GC&SF Survey, Pecos County, which has been testing, assured a good well from the Yates lime when it flowed 23 bbl. of oil in 1½ hours through casing perforations at 2,840-80 ft. Oil tested 35.7 gravity. The wildcat was drilled to 3,604 ft., and plugged back to test the shows.

Andrews County.—Sun Oil Co. 1 Gardner, Section 17, Block A-35, PSL Survey, 2 miles west of the Means pool, which had swabbed 75 bbl. natural to assure a new producing area, was cleaning out after shot of 340 qt. from 4,431 to 4,556 ft. This well is about midway between the Means pool and the one-well Signal pool, and may serve as a link between the two, thereby adding several hundred more producing acres to the area. The Fullerton pool appeared to have been extended for a distance of 1¾ miles east at Frankel Brothers 1-D University, Section 3, Block 13, University Survey. This well had top of the Fullerton pay at 6,786 ft., and drilled to a total depth of 6,886 ft., cementing casing at 6,755 ft.

Garza County.—A shutoff of water seemed to have been accomplished at Honolulu Oil Co. and Devonian Oil Co. 1 D. R. Payton, Section 1421, TTRR Co. Survey. The prospect, which had shows of oil at 3,546 ft., plugged back to 3,564 ft. and exhausted the water, and oil rose to within 400 ft. of the top. Additional acid treatment will be attempted.

Lamb County.—Humble 1 Jackson, Section 119, Block A, R. M. Thompson Survey, southeast part of county, total depth 5,885 ft., took 1 hour drill-stem test at 5,683 to 5,885 ft., and recovered 112 ft. oil-cut drilling mud.

Reagan County.—Standard Oil Co. of Texas 1-28-358 University, Section 12, Block 12, University Survey, southwest of Barnhart pool, had show of oil in lime at 2,438 to 2,519 ft., on a 2-hour drill-stem test 2,427-83 ft. showed 42 ft. of drilling mud. The section will be treated with acid.

Borden County. — Northern Ordnance, Inc. 1-A Clayton, 13-32-4n, T&P Survey, elevation 2,475 ft., found top of San Andres lime 189 ft. low at 2,985 ft., and was abandoned. The same operator's 1 Clayton & Johnson, 32-31-4n, T&P Survey, 3½ miles southeast, was drilling ahead below 7,221 ft. in black shale.

Two important wildcats were announced for the district. In Upton County, Magnolia Petroleum Co. 1 American Republics Corp. is a new 6,500-ft. test, NW NW 8-40-1s, T&P Survey, 16 miles northeast of McElroy pool. In Yoakum County, Skelly Oil Co. will drill a 7,800-ft. test, NW NW Section 446, Block D, J. H.

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One of the most versatile—yet unerringly accurate reducing valves. Regulates oil, gas, steam, water or air under constant or pulsating initial pressures up to 300 lbs. The reduced pressure range is from 1 lb. to 75% of inlet, not exceeding 125 lbs. Pressure setting is easily adjusted. Inner valve construction assures proper seating and minimum pressure drop at full valve opening. Beveled discs are standard, with other types available.

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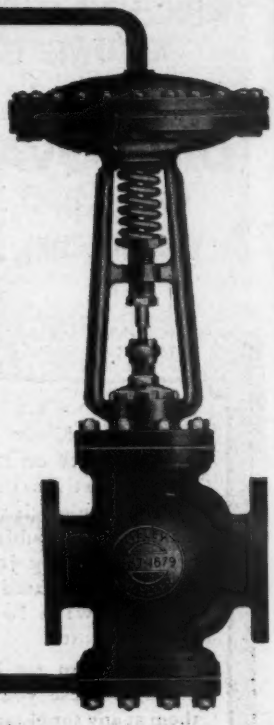
429	2" to 8"	Semi-steel or Cast-steel



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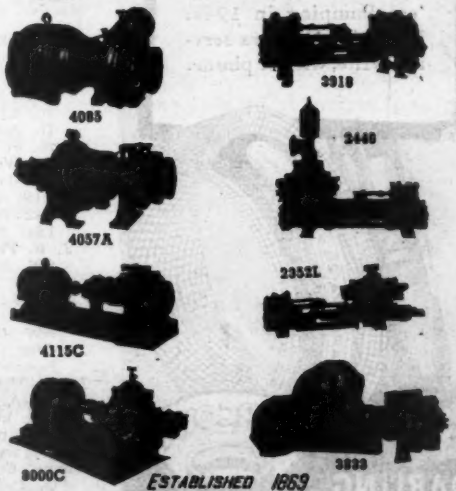

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THE ORIGINAL COMPOSITION CUP
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Gibson Survey, 5 miles north and 1 mile west of the West pool.

WEST TEXAS WILDCAT COMPLETIONS

Borden County: Northern Ordnance 1-A Clayton, Sec. 24, Blk. 32-4n, T&P Ry. Sur., elev. 2,475 ft., San Andres 2,985 ft., dry, TD 3,346 ft.

Mitchell County: Col-Tex Ref. 1 H. C. Miller, 322 ft. from N, 2,268 ft. from W, Sec. 22, Blk. 28-1n, T&P Ry. Sur., elev. 2,135 ft., brown lime 4,390 ft., chert 7,865 ft., Ellenburger 7,922 ft., dry, TD 8,200 ft. Deep test in Westbrook pool.

Pecos County: Standard Oil of Texas 1-C Mac Der Co., Sec. 64, Blk. 11, H&GN Ry. Sur., elev. 3,002 ft., Yates 1,258 ft., frosted grains 1,270 ft., Wolfcamp 4,974 ft., detrital 5,258 ft., quartz 5,300 ft., granite 5,373 ft., dry, TD 5,374 ft.

ILLINOIS

Completions Outnumbered By New Operations

CENTRALIA, Ill.—Fifty-two new operations as against 31 completions marked an unusual situation in the field in Illinois in the past week. No outstanding new wells were reported. .One wildcat found oil, Schuller & Witt 1 Borah in 3-5n-9e, Jasper County, which started at 57 bbl. per day from McClosky lime.

The 52 new operations reported during the week included 11 wildcats in 9 counties as follows: M. L. Livingood 1 E. L Herron, NE NE NE 23-36n-9e, Will County; Pure Oil Co. 1 K. C. Moore, SE SE NW 13-4n-9e, Richland County; Homer Luttrell 1 Ed. Highsmith, NE NE NE 9-2n-9e, Lawrence County; W. C. Fortner 1 Williams, SE SE SW 22-4s-9e, White County; A. J. Hammer 1 D. E. Dieport, SE NE NW 23-5n-4e, and Paul Doran 1 A. Mueller, NW SW SE 4-5n-1e, Fayette County; W. H. Krohn 1 C. Smith, SE SE SE 10-4n-5e, and The Texas Co. 1 G. C. Knelly, NW NW WN 10-5n-7e, Clay County; Sohio Petroleum 1 E. F. Webb estate, SE SW SE 17-5s-4e, Franklin County; Sohio 1 Schunoski, NE NE SW 5-4s-2w, Washington County, Ray Frank 2 H. G. Bassett, NW NE NW 23-6n-9w, Madison County.

ILLINOIS WILDCAT COMPLETIONS

Clinton County: Texas 1 H. A. Groppenhaur, NW NW NE 9-3n-4w, dry at 1,177 ft., Golconda 762 ft., Cypress 812 ft., Cypress sand 835 ft., Benoist 956 ft., Aux Vases 978 ft., McClosky 1,092 ft., St. Louis 1,094 ft.

F. E. Webb et al 1 Mueller, SE NW SE 2-4n-1w, dry at 2,940 ft., Glen Dean 1,158 ft., Cypress 1,345 ft., Benoist 1,429 ft., Aux Vases 1,478 ft., St. Louis 1,647 ft., Devonian 2,847 ft.

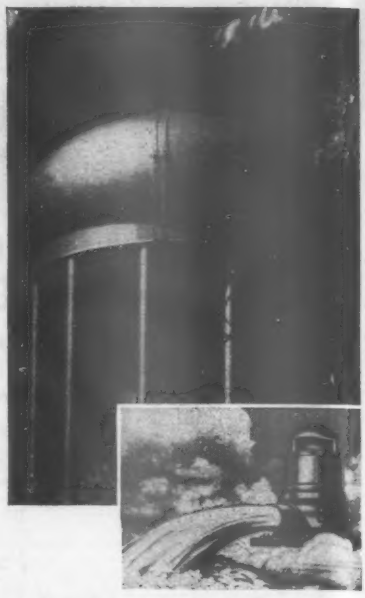
J. B. Finley 1 Wedenkemper, NW SW SW, 33-3n-1w, dry at 1,408 ft., Glen Dean 1,072 ft., Cypress 1,244 ft., Benoist 1,386 ft.

Effingham County: B. M. Heath 1 Walker, NW NW SE 22-6n-6e, dry at 2,825 ft., Glen Dean 2,235 ft., Cypress 2,436 ft., Benoist 2,552 ft., Fredonia 2,710 ft.

Jasper County: Schuller & Witt 1 Lourance, NE SW SE 3-5n-9e, McClosky lime at 3,056-65 ft., TD 3,065 ft., acidized, pumped 57 bbl. of oil. Discovery well.

Wayne County: Illinois Prod. Corp. 1 O. C. Borah, SW SW SW 24-2n-9e, dry at 3,285 ft., Menard 2,340 ft., Cypress 2,886 ft., Aux Vases 3,096 ft., McClosky lime 3,200 ft.

M. C. Freeman 1 Sineff, NW NE SW 20-1n-9e, dry at 3,338 ft., Glen Dean 2,713 ft., Aux Vases 3,204 ft., McClosky 3,318 ft.



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BUILDERS OF WELL WATER SYSTEMS FOR INDUSTRIES AND MUNICIPALITIES

White County: Sohio 1 F. D. Churchill, NE NE SE 33-3s-6e, dry at 3,537 ft., Glen Dean 2,756 ft., Cypress 3,007 ft., Benoist 3,255 ft., Aux Vases 3,328 ft., McClosky 3,475 ft.

Kingwood Oil 1 D. M. Brockett, SW SE NE 29-3s-9e, dry at 3,352 ft., Menard 2,349 ft., Cypress 2,830 ft., Benoist 3,003 ft., Aux Vases 3,128 ft., McClosky 3,226 ft., St. Louis 3,345 ft.

OHIO, KENTUCKY

Gas Field Discovered in Lorain County Area

COLUMBUS.—Lorain County has another new gas pool in the southeast part of Charles Township. The discovery by Belmont Quadrangle Drilling Co. on the Mahler fee in Section 24, gaged 1,335,000 cu. ft. from Clinton sand at 2,386-98 ft.

A well was completed in the Sandyville field by the Natural Gas Co. of West Virginia on the Motter farm, Section 9, Pike Township, Stark County. Clinton sand at 4,575 to 4,613 ft. and 4,615-37 ft. gaged 928,000 cu. ft. with a rock pressure of 1,280 lb.

Chartiers completed a 40-bbl. well in the New Straitsville pool on the Hocking Valley Products fee, Section 33, Coal Township, Perry County. This part of the pool has been inactive for some years.

The Clayton pool was extended a location northeast by a 30-bbl. well in Section 4, Clayton Township. The completion was by the Preston Oil Co. on the Embrey farm.

OHIO WILDCAT COMPLETIONS

Geauga County, Middlefield Township: Geauga Dye & Machine 1 fee, Lot 32, lime 2,240-2,517 ft., show gas, dry, TD 2,517 ft.

Medina County, Guilford Township: Northern Ordnance, Inc. 1 Nettie Kreider, Sec. 28, Clinton 3,531-46 ft., 3,562-94 ft., dry, TD 3,614 ft.

Richland County, Monroe Township: Ohio Fuel 1 Mansfield B. & L., Sec. 16, Clinton 2,608-10 ft., dry, TD 2,705 ft.

Washington County, Grandview Township: G. C. Heddleston 1 Wm. Eaton, Sec. 13, shale, dry, TD 3,423 ft.

INDIANA

EVANSVILLE.—Four wells were reported completed during the week, including two oil wells, one dry hole and one gas well. No wildcats were completed.

WESTERN KENTUCKY

OWENSBORO.—Union County came up with six completions in the past week, ranging from 75 bbl. up to 450 bbl. per day, and averaging 181 bbl. per well. Western Kentucky had 13 completions, 10 oil wells and 3 dry holes.

WESTERN KENTUCKY WILDCAT COMPLETIONS

McLean County: Sohio 1 O. C. Whitfield, SW NE NE 2-N-25, dry at about 2,000 ft.

Barren County: Miller & Mullen 1 Carson Johnson, dry at 404 ft.

Todd County: Putnam & Hobson 1 B. Allison, 13-G-28, dry at 800 ft., top of Chattanooga 675 ft., Devonian 712-800 ft.

EASTERN KENTUCKY

ASHLAND.—A noninflammable gas, suspected of being helium, was struck in the Berea sand in a well being drilled by S. C. Allen on the Maddox lease in the new Rockey Branch oil field in Elliot County. Sample of the gas has been taken to the Lexington laboratory of the state geologist for examination.

Two oil wells and one dry hole were reported from the Rocky Branch field this week, while other areas reported three gas well completions and one dry hole. Ashland Oil & Refining completed 5-bbl. wells at 1 Albert Isom, depth 1,000 ft., and 3 J. W. Gillum, depth 1,013 ft. S. C. Allen et al 1 Amos Thornberry was dry at 766 ft., in the Weir sand, but drilling may continue to deeper levels.

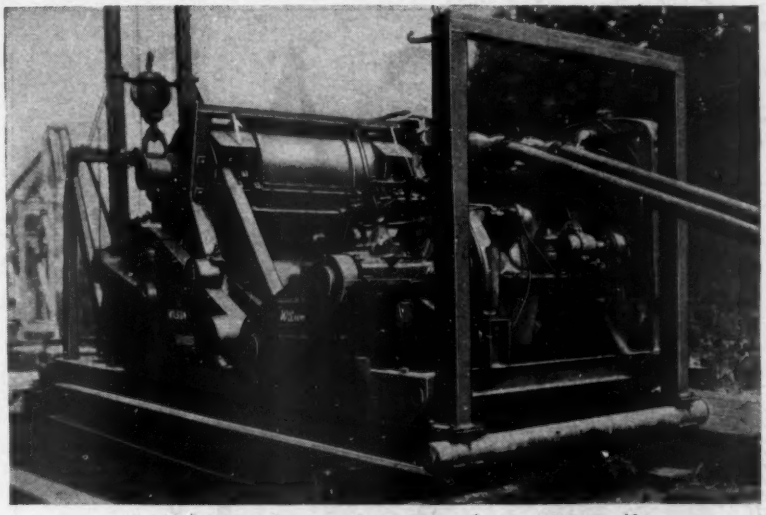
Inland Gas Corp. completed well 255, Kentucky-West Virginia Gas Co., on Abbott Creek in Knott County as a dry hole at 815 ft. in the Maxon. Kentucky-West Virginia Gas Co. completed well 751, Jeff Spears, River Branch of Johns Creek in Pike County, flowing 119,000 cu. ft. of gas from shale and 52,000 cu. ft. from the brown lime, total depth 2,844 ft.

Kentucky-West Virginia Co. also completed well 5518, Alexander Hall, Mink Branch of Big Mud Creek, Floyd County, with an open flow of 215,000 cu. ft. of gas, total depth 3,105 ft., while same company's well 5523, Mary C. Porter tract on Daniels Creek in Johnson County, was completed with open flow of 133,000 cu. ft. of gas after shot, total depth 2,310 ft.

CANADIAN FIELDS

Bow Island Sand Production Found in Denhart Dome Test

CHATHAM, Ont.—On the Denhart dome in the Steveville area east of Calgary, Princess-Steveville Synd. 1, LSD 7, 14-20-11w4, bottoming at 2,567 ft., swabbed to 5 bbl. an hour, later blowing into production with 350 lb. back pressure at 100



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to 120 bbl. a day with 1,000,000 cu. ft. of gas. Production is 25 A.P.I. crude from a sand at 2,518-67 ft. before perforating and acidizing. Princess-6 P.R. 8 has been spotted by California-Standard in LSD 16, 21-20-12w4.

Taber.—In the Taber field, southern Alberta, California-Standard 55-20-B, LSD 11, 20-9-16w4, was dry at 3,236 ft. Major 1, LSD 12, 9-9-17w4, at 4,257 ft. has shut off a heavy gas flow and installed light rig and run tubing for a test of oil production. Mid-Continent 5, LSD 11, 35-7-16w4, is coring below 3,210 ft.

Conrad.—California Standard-Conrad 2, LSD 1, 5-6-15w4, has plugged back from top of lime to 2,970 ft. and is testing, with fair oil indications.

Legend.—California Standard-Legend 2, LSD 14, 4-6-12w4, is being abandoned after striking water in the top of the lime at 3,193 ft.

Pinhorn.—McColl-Frontenac, LSD 9, 17-1-8w4, on the Pinhorn dome, southern Alberta, is coring and testing around 3,288 ft.

Foremost. — British American - McColl Frontenac 1, joint test, in the Foremost area, southern Alberta, is coring below 3,033 ft.

Moose dome.—On the Moose dome, in the foothills west of Calgary, John Crossi and associates Elbow Falls 2, LSD 4, 28-22-6w5, is testing a strong gas flow struck ni Devonian limestone at 659 ft. Drilling will be continued to test an oil horizon, around 1,600 ft., in which Moose Dome 2 encountered a small commercial production of light crude.

Turner Valley.—In North Turner Valley, Home Oil 16, LSD 9, 18-21-3w5, westerly outpost well, finished at 8,745 ft. with lime at 8,334 ft., is making around 865 bbl. daily. Home 17, LSD 1, 18-21-3w5, finished at 8,851 ft. with lime at 8,330 ft., is making around 120 bbl. with the aid of booster gas.

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OKLAHOMA

W. Edmond Continues to Dominate Activity

ALTHOUGH Oklahoma operators have more active and favorable prospects to watch than for many years, in a scene in fact remniscent of "boom" days, the West Edmond field repeatedly steps back into the limelight with more and more displays of the characteristics of a major pool. Phillips Petroleum Co. 1 Cavin, NE NW 32-15n-4w, flowed 465 bbl. through a ½-in. tubing choke, to extend the field 3 miles north and into Logan County, thus making a three-county field, since production had already extended west from Oklahoma County into Canadian County. The Phillips well is 9 miles north of the farthest south producer, which is in NE NE 17-13n-4w.

Continental Oil Co. 1 Casey, SW SE 21-14n-4w, was running casing and preparing to bring in an east extension well. Mid-Continent Petroleum Corp. 1 Lynch, NE NW 18-4n-4w, on test flowed 572 bbl. in 2½ hours through a 1½-in. tubing choke on 2½-in. tubing.

With 80 producers, 40 drilling wells and 175 possible proven locations, the operators have sent out calls for more drilling contractors with equipment capable of handling the 7,000-ft. wells.

Beckham County.—Northern Ordnance, Inc. 1 Crawford, NW SE 25-9n-22w, about 30 miles due east of the Shamrock pool of Wheeler County, Texas, found saturated granite wash at 6,630-38 ft. and was preparing to make a drill-stem test.

Carter County.—Pure Oil Co. has apparently opened a new deep pay in the Springer field, as its 1 Taylor, NW NW 26-3s-1e, flowed 27 bbl. of oil in 30 minutes on drill-stem test from Bromide zone at 5,355-71 ft.

Grady County.—Two new pools loomed as Skelly Oil Co. et al 1 Goodwin, SE NW 8-5n-8w, on test had several small flows of oil and water from the Marchand sand at 9,585-10,400 ft., while Oklahoma Natural Gas et al 1 Rider, NE NE SE 16-5n-8w, on the northwest flank of the Chickasha field, plugged back from 6,270 ft., and was shut in after getting a flow of 25 bbl. of oil and 8,000,000 cu. ft. of gas from basal Permian sand at 3,115-20 ft.

Pontotoc County.—Sunray Oil Co. 1 Jonas, SW NE SW 17-5n-8e, in the old Allen pool flowed 734 bbl. from the Wilcox sand in the first 24 hours, later increased to 40 bbl. per hour, then was pinched to 30 bbl. per hour. This will mean a redrilling campaign for the deep pay.

OKLAHOMA WILDCAT COMPLETIONS

Cleveland County: Mid-Continent Petroleum 1 Westermeier, NE SW SW 26-10n-3w, 757 bbl. and 2,000,000 cu. ft. of gas in 20 hours, 24/64-in. tubing choke, pay zone 8,833-66 ft., second Wilcox, TD 8,900 ft., Woodford 7,930 ft., Hunton 8,040 ft., Viola 8,500 ft., dolomite 8,630 ft., second Wilcox 8,835 ft. South Moore pool discovery.

Creek County: J. Garfield Buell 1 Cobb, NE SE SE 2-14n-9e, dry, TD 2,633 ft.

Garvin County: Helmerich & Payne (formerly Ohio Oil Co.) 1 Freeman, old well drilled deeper, SE SE SE 14-1n-1w, 150 bbl. and 1,000,000 cu. ft. of gas through ¼-in. tubing choke, pay zone 1,098-1,100 ft., old TD 4,365 ft., PB to 1,248 ft.

Stanolind Oil & Gas et al 1 McPherson, NW NW SE 27-4n-1e, dry, TD 4,455 ft., Bromide dense 4,170 ft.

Roodhouse et al 1 Harris, NW NW NW 23-3n-1e, dry, TD 3,630 ft., Bromide 3,329 ft., second Bromide 3,498 ft.

Kiowa County: McIntyre, Sherman &

Cummings 1 Hobbs, NW NW NW 10-6n-16w, dry, TD 1,785 ft., base McLish and top Oil Creek zone 1,785 ft.

Oklahoma County: Anderson-Prichard 1 Crookham "A," NE NE 17-13n-4w, 365 bbl. in 4 hours through 1-in. tubing choke, TD 6,943 ft., Oswego 6,470 ft., Hunton 6,770 ft., Bois d'Arc pay zone 6,835-6,910 ft. West Edmond extension.

Pontotoc County: F. F. Pennington 1 Breeden, SE SE SW 6-2n-5e, dry, TD 2,153 ft.

Stephens County: Sohio Petroleum 1 Ridgeway, SW NE SE 17-3s-4w, 4,920,000 cu. ft. gas, TD 2,225 ft., pay zone 1,586-1,634 ft. Gas discovery.

Tillman County: Miller & McCormick 1 Webb, NW NW NE 34-1n-18w, dry, TD 3,000 ft.

MISSISSIPPI

Heidelberg Getting Four Good Wells, Eucutta Two

JACKSON.—The Heidelberg pool is getting four good wells and one possible dry hole as the week ended, with the Eucutta pool registering two pumpers about to be completed. Graham & Lewis 1 Husband Unit, approximately SW SW 29-1n-13e, was showing for one of the best completions to date in Heidelberg, having flowed 1,896 bbl. in 24 hours through a 48/64-in. choke, tubing pressure 106 lb., after perforating at intervals between 4,511 and 4,982 ft. with 2,252 shots. Top of the Eutaw is—4,162 ft.

Gulf-Hammil et al 1 Morrison Unit, approximately NW SW 29-1n-13e, swabbed and flowed 500 bbl. per day through 22/64-in. choke, tubing pressure 150 lb.; Sun Oil 1 Lindsey, approximately NW NE 31-1n-13e, flowed 630 bbl. per day through 5/8-in. tubing choke, tubing pressure 95 lb.; Rogers-Lacy 1 Clayton, approximately NE NE 32-1n-13e, would not flow after swabbing, was put on pump and is estimated at 400 bbl. per day. Gulf Refining 2 T. D. Lewis, SW SW 20-1n-13e, squeezed in an attempt to shut off salt water, but on drill-stem test filled tubing with 700 ft. of salt water; later swabbed through tubing, getting salt water with scum of oil.

In the Eucutta field, Gulf Refining 3 Stanley, approximately SW SW 31-10n-8w, after perforating at intervals between 4,998 and 5,191 ft., with 636 shots, was pumping 200 bbl. per day; Gulf Refining 4 Stanley, approximately NE SE 36-10n-9w, perforated at intervals between 4,884 and 5,112 ft., with 906 shots and was pumping an estimated 300 bbl. per day.

Angle & Angle 1 Masonite Corporation, SW SW 31-3n-11e, a wildcat about 15 miles northwest of the Heidelberg pool, got salt water in both the Eutaw and Tuscaloosa sands and will be abandoned at 6,081 ft.

H. L. Hunt 2 Ellis Musgrove, Land Lot 485, Land District 12, Clinch County, Georgia is dry at 3,460 ft. and will be abandoned.

In Escambia County, Alabama, Humble Oil & Refining Co. 1 Skinner, SE NW 10-3n-10e, is drilling below 6,500 ft. Three drill-stem tests, all showing salt water, have been reported; the first at 1,931-63 ft., the second at 4,095-4,120 ft., and the third at 5,072-92 ft.

MISSISSIPPI WILDCAT COMPLETION

Jasper County: J. B. White and Gulf Refining 1 B. C. Burns Unit, NE SE 20-1n-13e, dry, TD 5,580 ft. Heidelberg pool outpost.

FLORIDA WILDCAT COMPLETION

Madison County: H. L. Hunt 2 Gibson, SE SW 6-1s-10e, dry, TD 5,400 ft.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended July 8, 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Tot.	Oil	Dist.	Gas	Dry	Tot.
Ohio	0	0	0	4	4	0	0	9	35	44
Indiana	0	0	0	0	0	3	0	0	11	14
Illinois	1	0	0	8	9	12	0	0	157	169
Kentucky	0	0	0	3	3	5	0	0	33	38
Michigan	0	0	0	6	6	5	0	1	123	129
Kansas	0	0	0	10	10	30	0	5	222	257
Nebraska-Missouri-Iowa	0	0	0	0	0	1	0	0	7	8
Oklahoma	3	0	1	7	11	26	0	16	131	173
Texas:										
North Central	4	0	0	4	8	34	0	1	144	179
West	0	0	0	3	3	16	0	3	91	110
Panhandle	0	0	0	0	0	0	0	0	4	4
Eastern	1	0	0	5	6	4	0	1	72	77
Gulf Coast	0	0	0	6	6	22	8	10	107	147
Southwest	1	0	0	3	4	16	4	11	129	160
Total Texas	6	0	0	21	27	92	12	26	547	677
Louisiana:										
Northern	1	0	0	1	2	3	0	0	29	32
Southern	0	0	0	1	1	4	5	0	32	41
Total Louisiana	1	0	0	2	3	7	5	0	61	73
Arkansas	0	0	0	1	1	2	0	0	28	30
Mississippi	0	0	0	1	1	2	0	0	33	35
Alabama-Georgia-Florida	0	0	0	2	2	2	0	0	10	11
Montana	0	0	0	1	1	2	0	1	14	17
Wyoming	0	0	0	0	0	10	0	1	8	19
Colorado-Utah	0	0	0	0	0	2	0	0	21	23
New Mexico	0	0	0	0	0	3	0	1	35	39
California	0	0	0	14	14	3	0	5	102	110
Total United States	11	0	1	80	92	207	17	65	1,577	1,866
Total previous week	7	1	7	76	91					

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the lands herein described within the known geologic structure of the Lamb Anticline gas field, Wyoming, are offered to the responsible qualified bidders of the highest cash bonus per acre for lease under section 17 of the mineral leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. sec. 226), in the following parcels: Parcel No. 1, T. 51 N., R. 92 W., sec. 7, lot 8, 50.64 acres; Parcel No. 2, T. 51 N., R. 92 W., sec. 7, E½ lot 15, sec. 18, lots 5, 6, 9, 10, 11, 12, 15, and 16, 340 acres; Parcel No. 3, T. 51 N., R. 92 W., sec. 18, lots 7, 8, and 13, T. 51 N., R. 93 W., sec. 13, E½NE¼, NE¼SE¼, 272.39 acres; Parcel No. 4, T. 51 N., R. 93 W., sec. 13, W½NE¼, NE¼ NW¼, SE¼NW¼, 200 acres; Parcel No. 5 T. 51 N., R. 93 W. sec. 11, SE¼NE¼, E½SE¼, sec. 12, SW¼NE¼, S½NW¼, N½ S½, 400 acres; Parcel No. 6, T. 51 N., R. 93 W., sec. 1, S½SW¼, sec. 2, SE¼SE¼, sec. 11, NE¼NE¼, sec. 12, NW¼NE¼, N½NW¼, 280 acres. Sealed bids will be received in the office of the Secretary of the Interior, Interior Building, Washington 25, D. C., up to twelve noon August 7, 1944. Bids must be submitted on each parcel separately, but if two or more parcels are awarded to the same bidder they may be combined in a single lease provided the acreage does not exceed 640 acres. Each bidder must submit a certified check or cash for one-fifth of the amount bid payable to the order of the Treasurer of the United States and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid, and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned. The envelopes should be plainly marked "Bid for Parcel No. ——, Lamb Anticline gas field. Not to be opened before noon August 7, 1944." No bids received after the time fixed herein for submitting bids will be considered. The successful bidders will be required to agree not to discriminate against any employe or applicant for employment because of race, creed, color, or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

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Among the Drilling Contractors

Drilling Contractors, Ltd., of Calgary, has contract for Jasper Syndicate 1, 19-49-26w5, to spud this month. The well jointly sponsored by Home Oil, Anglo-Canadian Oil and Imperial Oil, will test a new area on the Folding Mountain structure west of Jasper Park, in the northern Alberta foothills and south of the Shell-Solomon Creek test near Entrance.

Clarence Matthews, for the past 8 years with Anglo-Canadian Oil Co. at Calgary, has resigned and, with associates, will organize a drilling company to operate in the southern Alberta fields.

Clayton Severns & Associates have been set up primarily as a drilling contractor for California fields. Copartners are Clayton Severns, J. W. Severns, R. D. Disher, K. H. Chesley, and Ashley DeWitt, all experienced drillers.

Rocky Mountain Drilling Co. is making good progress with the deep test which the company is drilling under contract for Standard Oil Co. of California in the Semi-Tropic gas field of Kern County, California. Rocky Mountain maintains offices in Los Angeles.

Arrow Drilling Co. has the contract on a test Sinclair Prairie Oil Co. will drill in NW SE NE 35-8s-2e, Love County, Oklahoma, northeast of Thackerville. Derrick has been completed for the test, the 1 Donaghey.

Fain Drilling Co. is the contractor on the Continental Oil Co. 1 Dodson, in SW NW NE 7-2s-3w, Carter County, Oklahoma, a 9,000-ft. test southeast of Alma, which was rigging up.

George Pace, Duncan, Okla., has sold a heavy-duty unit, now active in the West Edmond, Oklahoma, field, to Ace Gutowsky, of Oklahoma City, the latter will drill a well for Herbert J. Schmitz, then will develop his own lease.

R. S. Meadows is the drilling contractor on Oscar Donley and associates 1 Ross Mitchell, A. J. Witt Survey, Red River County, Texas. This wildcat was staked last January, but is just now getting under way. It will be a rotary test to the Paleozoic beds.

Fisher-McCall Oil & Gas Co. is the contractor on the S. L. McCall 1 R. T. Vincent, in SE SE SE 32-3s-14w, Van Buren County, Michigan.

Olson Drilling Co. is the contractor on Oklahoma Natural Gas Co. 6 Mannie Chandler, in C NE SE 27-5n-8w, Grady County, Oklahoma. Test was rigging up and will test the 6,000-ft. pay.

Frank Brahaney has been awarded the contract for Skelly Oil Co. 1 W. S. Hodges, Section 446, Block D, John H. Gibson Survey, Yoakum County, Texas. The test is to be drilled to 7,800 ft. to explore the Clear Fork zone of the Permian.

F. H. Sabourin, who represented Darby Petroleum Corp. in Midland, Tex., before that company was acquired by Sunray Oil Corp., has moved to Wichita, Kans., where he is to be production superintendent for Sunray.

Robert D. Bright, engineer at the head office of Shell Chemical Co., has been transferred to the Martinez refinery as chief chemist.

Robert M. Harris, California independent producer, has purchased the interest of his partner in the firm of Harris & Sherman, and will operate as an individual.

Angus W. Compton has been made district chief clerk of the Hawkins, Tex., district by Humble Oil & Refining Co.

J. W. Watson, who was treasurer of Shell Oil Co., Inc., in New York, has been made assistant secretary and assistant treasurer of Shell Union Oil Corp., in San Francisco. Watson has been with the Shell interests since 1930.

Harry W. Baker, of Cambridge, Ohio, has retired from active service after 36 years with Ohio Fuel Gas Co. and its predecessor, Ohio Fuel

Supply Co. For the past 17 years Baker has been district manager in Cambridge. He is succeeded by **F. B. Seaman**, of Tiffin.

Gerald C. Roberts, formerly on the geological staff of Sinclair Prairie Oil Co. at Midland, Tex., has joined American Trading & Production Co. there as district geologist.

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LA.-ARK.

Lake St. John Condensate Reserves to Be Determined

SHREVEPORT.—The California Co. is reported preparing to drill six tests in the condensate area of the North Lake St. John pool, in eastern Louisiana. If the data on reserves thus obtained comes up to the expectations of the company, an application will be filed with the Petroleum Administration to obtain materials for installation of a cycling plant.

North Louisiana and Arkansas operators wound up a busy week with four field oil wells and one wildcat dry hole in Arkansas; three oil wells, two gas wells and two dry holes in the North Louisiana fields, plus completion of one successful wildcat and one dry hole wildcat in Louisiana.

The best completions of the week were Midstates Oil Co. 1 Taylor-Beene, SW NW 3-20s-20w, Haynesville Extension pool on the Arkansas side, completed for 819 bbl. from pay zones at 5,455-63 ft. and 5,508-26 ft.; and The California Co. 2 Beasley in 8-9n-10e, North Lake St. John pool, Tensas Parish, completed for 370 bbl. from Massive sand at 9,078-95 ft.

ARKANSAS WILDCAT COMPLETION

Union County: Marine Oil et al 1 First Nat. Bank, SE SE 7-19s-13w, dry, TD 7,765 ft. Salt water in Smackover lime.

NORTH LOUISIANA WILDCAT COMPLETIONS

Caddo Parish: O. R. Pennington 1 Williams, SW SW 3-15n-15w, dry, TD 5,208 ft.

Webster Parish: Cotton Valley Operators Committee 1 Gray, center 26-21n-10w, joint test for deeper pay, 120 bbl., pay zone 10,651-81 ft., TD 10,681 ft.

Michigan Fields

(Continued from page 131)

in Van Buren, Oceana, Osceola and Allegan counties.

MICHIGAN WILDCAT COMPLETIONS

Clare County: Taggart Bros. 1 Freer, E½ 18-17n-6w, dry, TD 1,555 ft.

Lake County: Manistee Development 1 Stephens, NW NE NE 18-19n-14w, dry, TD 2,150 ft., Traverse 2,090 ft.

Sohio Petroleum 1-A State, S½ SW SE 28-17n-12w, dry, TD 3,479 ft., Dundee 3,305 ft.

Montcalm County: Sterling Development 1 Parker, SW NW S 34-11n-10w, dry, TD 1,050 ft.

Van Buren County: Muter Oil 1 Bartholomew, SW SE NE 26-2s-16w, dry, TD 1,050 ft.

Michahoma Oil 1 Gannett, NE SW SW 36-1s-16w, dry, TD 1,050 ft.

Power and Brown Head California Committees

LOS ANGELES.—Henry F. Power, General Petroleum Corp., and R. I. Brown, Standard Oil Co. of California last week were elected chairmen of two standing subcommittees of the Conservation Committee of California Oil Producers.

Power heads the new administrative committee and Brown is chairman of the allocation committee.

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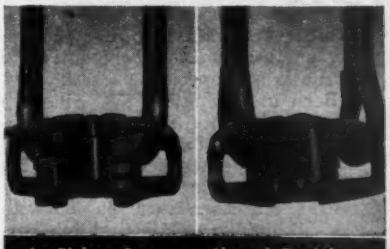


In Either Open or Closed Position

BJ "AA" ELEVATORS ARE REALLY BALANCED

By incorporating a newly devised roller type balancing cam in BJ "AA" Elevators the work of the derrick man is made much easier. Rated at 300 tons, with a safety factor of four to one, this elevator is made of high alloy steel—fully heat treated—flame hardened on the top bore to minimize upsetting—and is equipped with an unusually sturdy latch. Ask the BJ man or your supplier.

BYRON JACKSON CO.

Houston • LOS ANGELES • New York

PERSONALS

Leaves Tropical to Become Head of Royalite

P. F. SHANNON, new president of Royalite Oil Co., Calgary, Alta., had been in the service of Tropical Oil Co. since November 1928, first as field superintendent at Barrancabermeja, Colombia, and since 1933 as manager of all Tropical's producing operations. Both companies are affiliates of Imperial Oil, Ltd.

Born in Lexington, Ky., Shannon graduated from University of Kentucky with a B.S. degree in civil engineering. He worked a while for Missouri Pacific Railway in Nebraska and then cast his lot with the oil industry. His first job was with Indian Oil Refining Co., in its Lawrenceville, Ill., plant. A few weeks after this country entered World War I he joined the U. S. Army 307th Engineers, and was sent overseas. He was mustered out in December 1918.

Returning to the petroleum business, Shannon for 6 years was superintendent of Continental Oil Co. for Wyoming and Montana. From 1924 to 1928 he was professor of petroleum engineering at Colorado School of Mines, leaving the faculty to go to South America for Tropical. He received his doctorate from Colorado School of Mines in 1939.

Thomas E. Matson, recently discharged from Army service, has joined the geological staff of Pure Oil Co. at Olney, Ill. He will help in work in the Cisne area, taking the place of **Ralph E. Beeker,** who was transferred to the Michigan producing division.

J. M. Reidy, who has been assistant to **S. I. Hulse,** vice president of Warren Petroleum Corp., Tulsa, is now district manager of the company's Houston office, directing operations in the Gulf Coast territory. Reidy has been with Warren since 1938. He is suceeded in Tulsa by **J. F. Creel,** with the company since 1936.

John G. Neukom, formerly associated with the management engineering firm McKinsey, Kearney & Co., Chicago, has been appointed director of fuel rationing in Office of Price Administration. He has been active in the task of organizing the rationing of both fuel oil and gasoline. He succeeds **A. B. Whitman,** who resigned because of ill health.

J. F. Darby, who was president of Darby Petroleum Corp., recently acquired by Sunray Oil Corp., and **D. C. Bothwell,** vice president and treasurer, are organizing a new oil-producing company, whose headquarters will be in Wichita, Kans. Other Darby men interested in the project are **Rodney A. Bothwell,** who was head of the land department; **E. A. Koester,** geologist; **W. H. Barclay,** assistant production manager; **S. P. Anderson,** head of the accounting department, and **T. A. Waibel,** secretary to the president and vice president.

Col. B. F. Johnson, formerly superintendent of the Hongkong terminal for The Texas Co. (China), Ltd., and now petroleum coordinator for the U. S. Army Air Forces in the European theater, has received the Legion of Merit. Gen. Dwight D. Eisenhower in his citation said Colonel Johnson had made valuable contributions to "a highly efficient joint supply system, which has been used as a model in other theaters."

Daniel J. Harvey, Oil City, Pa., for 45 years in the service of The Pennzoil Co. and its predecessor companies, has gone on the retired list. He was superintendent of Plants 2, 3 and 4.

T. O. Grisell, for the past 10 years sales manager for Kendall Refining Co., Bradford, Pa., has tendered his resignation, effective August 1. Grisell formerly was executive secretary of Pennsylvania Grade Crude Oil Association. When Herbert Hoover was secretary of commerce Grisell was a member of his committee on cost and distribution. His plans for the future were not announced.

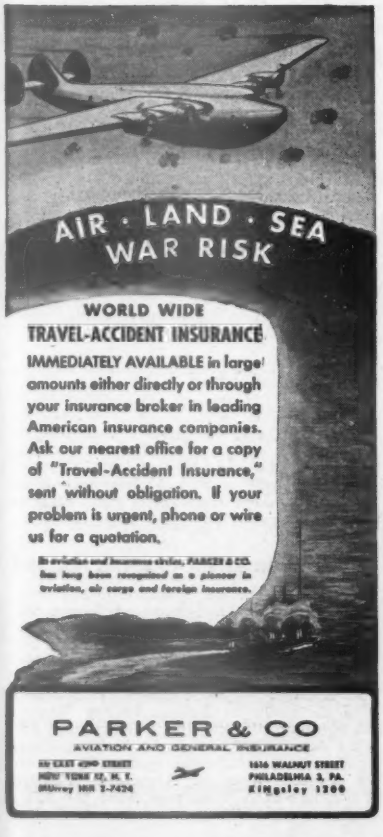
Jerry Curtis, formerly scout for Magnolia Petroleum Co. in Oklahoma City, has been transferred to Roswell, N. M.

W. F. Thiede, general superintendent of the Bayonne refinery of Standard Oil Co. of New Jersey, has been named assistant manager of the company's New Jersey works. **Stanley A. Wuchter,** assistant general superintendent of the Bayonne plant, has been made general superintendent, and **George A. Esty,** former process superintendent at the same plant, in turn, succeeds him as the new assistant general superintendent. The New Jersey works, which includes the Bayonne, Bayway and Eagle operations, is headed by **George H. Mettam,** manager. Thiede started as a regular employe of Standard of New Jersey at its Bayway plant in 1912. Wuchter began with the company in 1920, in the general engineering department at Bayway. Esty, who has been process superintendent at Bayonne, joined the company in 1916.

John W. Bryner, of Minard Run Oil Co., Bradford, Pa., was reelected president of the Bradford district, Pennsylvania Oil Producers Association, last week. **David Scott, Jr.,** was chosen first vice president; **Carl Oliver,** second vice president; **George H. Daggett,** treasurer.

H. B. Dickenson has resigned as scout for Sinclair Prairie Oil Co. in the West Texas and New Mexico region, a post he held for about 10 years, and plans to move to a farm near Midland, Tex. He is succeeded by **Fred E. Holloway,** of Dallas, formerly in the production department of The Texas Co.

Herbert P. Schoeck, assistant treasurer of Standard Oil Co. (New Jer-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WAR RISK
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TRAVEL-ACCIDENT INSURANCE
IMMEDIATELY AVAILABLE in large amounts either directly or through your insurance broker in leading American insurance companies. Ask our nearest office for a copy of "Travel-Accident Insurance," sent without obligation. If your problem is urgent, phone or wire us for a quotation.
PARKER & CO
AVIATION AND GENERAL INSURANCE

sey), has been elected treasurer of that company's operating subsidiary, Standard Oil Co. of New Jersey. He succeeds **Jay E. Crane,** recently elected a director of the parent company. **Edward McNeil,** head of the foreign exchange division of Standard of New Jersey, succeeds Schoeck as assistant treasurer of the parent organization. Schoeck went to work in 1917 as a clerk in the treasurer's department. In 1940 he was made assistant treasurer. McNeil has had 27 years' experience with the company, chiefly in the field of foreign exchange.

Edward B. Lyman, director of public relations for Standard Oil Co. (New Jersey) for several years, has joined the advertising agency of Foote, Cone & Belding, Inc., New York. He is director of public relations in the agency's organization.

MARKET QUOTATIONS

Prices as of July 11, 1944

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gal-

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	72-74
Mid-Continent	6.00-6.25	5.750-6.000
Gulf Coast	6.00-6.50	‡5.750-6.250
Northeast Coast	9.80	9.200
California		6.255-6.500

*Basis Oklahoma Group 3. †1939 C.F.R. (research method.) ‡Unleaded.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

A.P.I. REFINERY REPORT

Week ended July 1, 1944

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	155	3,031	498	1,461
Ind., Ill., Ky.	767	18,523	3,428	5,367
Okla., Kan., Mo.	380	7,486	1,421	1,328
Censored area*	2,399	36,891	15,513	18,834
Rockies	103	2,440	661	336
California	834	15,188	30,714	8,034
Total 7- 1-44	4,638	83,559	52,235	35,360
Total 6-24-44	4,638	86,000	52,757	34,328
Total 7- 3-43	3,892	77,185	65,566	32,546

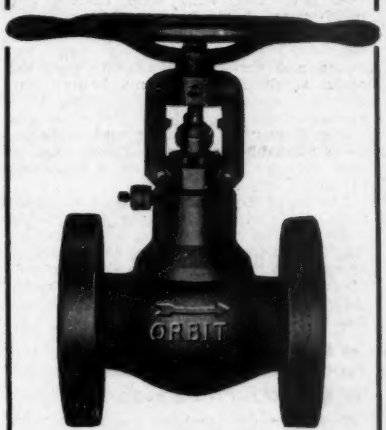
*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS
(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
July 1, 1944	228,860,000
June 24, 1944	229,332,000
July 3, 1943	240,927,000

SAND
VS
WING VALVES

The **ORBIT VENTURI TYPE VALVE** is manufactured with Stellite "J" Metal Seats which will not only withstand the abrasion of sand but is also corrosion resistant to all type of crude oil.



ORBIT VENTURI TYPE VALVE

This valve can be furnished thru all fabricators of Xmas Trees or thru any of your local supply stores at a price comparable to that of leading plug valves **YET** this valve requires no lubrication to effect a seal.

See Pages 2194 to 2211 in 1944 Composite Catalog

Specify

ORBIT VALVES

OIL WELL IMPROVEMENTS COMPANY

TULSA OKLAHOMA

Equipment Progress

New Type N Turbulaire Spray Dryer Developed by Western Precipitation

Western Precipitation Corp., 1016 W. 9th. St., Los Angeles, has announced development of the Type N Turbulaire spray dryer.

This versatile unit offers a number of important advantages for drying products such as fine chemicals and pharmaceuticals, and for investigation of spray drying problems. It is furnished in black iron, stainless steel or other alloys, and standard equipment includes electric heater, 4-ft. desiccator with cone bottom and hand-operated mechanism for sweeping surface accumulations from the conical section, Multiclone collector, fan, bag house and control instruments mounted on a single frame for maximum compactness and ease of installation. Only electrical, compressed-air and feed-line connections need be made, and the complete assembly occupies a floor space of only 5 ft. by 9 ft. 8 in. with a headroom of about 10½ ft.

The spray dryer is rated at an evaporation of 25 lb. of water per hour at an inlet-to-outlet temperature differential of 300° F. Varying conditions such as type of material handled, concentration of solids in the feed, etc., will, of course, cause this figure to vary well above or below the rated capacity.

Prosser and Lewis Named By Emsco D+B Division

F. L. Prosser has been appointed Mid-Continent sales manager of the D+B Division, Emsco Derrick & Equipment Co. Prosser joined the company in 1936 and was assigned the South Texas and Gulf Coast territory where he was instrumental in the installation of the first Mid-Continent field service stores for that territory. For the past 2 years, he has been manager of field stores for the D+B Division headquartering in Dallas.

Herschel Lewis, who succeeds Prosser, has a broad background in the petroleum industry having spent 9 years with Gulf Oil Co. In 1937, he became associated with Lamtex Equipment Corp. of Fort Worth and was in active charge of the management of installation, servicing, and sales of Lamtex equipment until his recent association with D+B.

Nullmatic Pressure Regulator

Moore Products Co. has developed a new regulator, designed to hold air pressures constant, regardless of changes in flow as well as variations in supply pressure. Constant regulated values over long periods of time are also functionally inherent in this design.

This regulator operates on the penumatic "null" balance principle and may better be described as a pressure controller, since the main air valve is operated by a detecting nozzle. This nozzle operates with a constant differential pressure to hold the manual loading spring at essentially the same position, regardless of variations in flow or in supply pressure.

An automatic bleed is provided, to operate when a reduced regulated pressure is required. The automatic bleed also serves to permit reverse flow when the regulator is used as a limit control on industrial instrument applications. A separate safety release is also incorporated in the design, to operate a few pounds above the regulated value.

All materials in contact with the air are corrosion resistant. The special neophene diaphragms used are suitable for continuous operation at temperatures up to 225° F. A manual adjusting knob and a fine thread facilitate accurate setting. Ease of operation is obtained through a ball thrust bearing.

These regulators are available in three standard ranges: 0-15 p.s.i.; 0-30 p.s.i.; 10-50 p.s.i.; and are suitable for use on supply pressures up to 150 p.s.i. Provision is made for panel or pipe mounting as required.

With 100 p.s.i. supply pressure and a 25 p.s.i. regulated pressure, the maximum capacity is approximately 10 s.c.f.m. (Patent applied for).

B. J. Sends Jack Smith to South America

The Oil Tool Division of Byron Jackson Co. announces the departure of Jack Smith to the oil-producing countries of South and Central America. He will visit Mexico, Venezuela, Ecuador, Peru, Colombia, and Trinidad, B.W.I., in the interest of new BJ products and in the general use and engineering of the BJ Elliott wire line core barrel. Smith will be gone for over 2 months.

O-C-T Holds Annual Sales Conference

Members of the Oil Center Tool Co. sales staff held a 3-day conference, June 7-10, at the company's plant on Airline Drive, Houston. Several new products and improvements in well-completion methods were demonstrated to the group.

Tubbs Cordage Co. Executive Returns From Duties With WPB

Herman D. Nichols, vice president of Tubbs Cordage Co., who has been on duty in Washington as hard fiber consultant and chief of the agricultural products branch of the Conservation Division, War Production Board, is back at his desk at 200 Bush Street, San Francisco, where he will take over an important part in Tubbs postwar planning.

Teifeld Joins Copperweld Steel

William W. Ege, general manager of sales of Copperweld Steel Co., Glassport, Pa., announces the appointment of A. R. Teifeld as advertising manager. Teifeld was formerly with American Steel & Wire Co., Cleveland, for about 21 years. His last assignment covered the supervision of that company's electrical, wire rope and construction materials advertising.

Teetsel Joins Thermoid

Thermoid Co., Trenton, N. J., announces the appointment of A. C. Teetsel as manager of friction materials manufacturing. Teetsel was executive vice president and a director of Ferodo & Asbestos, Inc., New Brunswick, N. J., from 1934 until recently. Previously, he did research, engineering and testing work with the Russell Manufacturing Co., Middletown, Conn.

Union Carbide and Carbon Elects Presidents of Subsidiary Companies

Announcement has been made by Union Carbide and Carbon Corp. of the election of the following presidents of subsidiary companies:

Dr. Joseph G. Davidson has been elected president of Carbide and Carbon Chemicals Corp., and Carbide and Carbon Chemicals, Ltd.

James W. McLaughlin is the new president of Bakelite Corp. He will direct all of the plastics operations of units of the corporation, including the plastics division of Carbide and Carbon Chemicals Corp.

Stanley B. Kirk becomes president of Linde Air Products Co., Prest-O-Lite Co., Inc., Dominion Oxygen Co., Ltd., and Prest-O-Lite Co. of Canada, Ltd. Kirk entered the employ of Union Carbide Sales Co. in 1915.

Arthur V. Wilker has been elected president of National Carbon, Inc., and Canadian National Carbon Co., Ltd. He became associated with National Carbon Co. in 1910.

Francis P. Gormely has been elected president of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Haynes Stellite Co., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd. He has served continuously in various production and executive capacties since 1909.

John D. Swain has been elected president of Electro Metallurgical Sales Corp. His service with Corporation Units began in 1915 when he joined the Union Carbide Sales Co. at Chicago.

John R. Van Fleet becomes president of United States Vanadium Corp. He has been identified with the natural resource supplies of the Corporation for many years, and is also president of Union Mines Development Corp.

Jarvis to Mid-Continent For Dragon Company

Harold R. Jarvis, associated with Dragon Manufacturing Co. of Marietta, Ohio, for the past 5 years, has been appointed to represent his company in the Oklahoma, Kansas and Illinois territory, according to announcement of W. R. Torner. He will make his headquarters at Tulsa, and will specialize in the sale of the leather and composition valve and pump cups manufactured by the company.

Caldwell Elected Vice President of Hyster Co.

Eugene Caldwell, general manager of Hyster Co., Portland, Ore., has been elected a vice president of that organization. Caldwell is a technical author of note and holds mechanical and electrical engineering and legal degrees.

Ruska Instrument Corp. is Formed

Ruska Instrument Corp., 4607 Montrose Blvd., Houston, has been organized for the purpose of manufacturing geophysical, petroleum engineering and refinery research instruments. The company has taken over the manufacture of instruments and equipment originally designed and formerly manufactured by Walter Ruska, operating as Ruska Instrument Co. Two new magnetometers will be put on the market in the near future. The stock of service parts of American Askania Corp. has been purchased from the alien property custodian.